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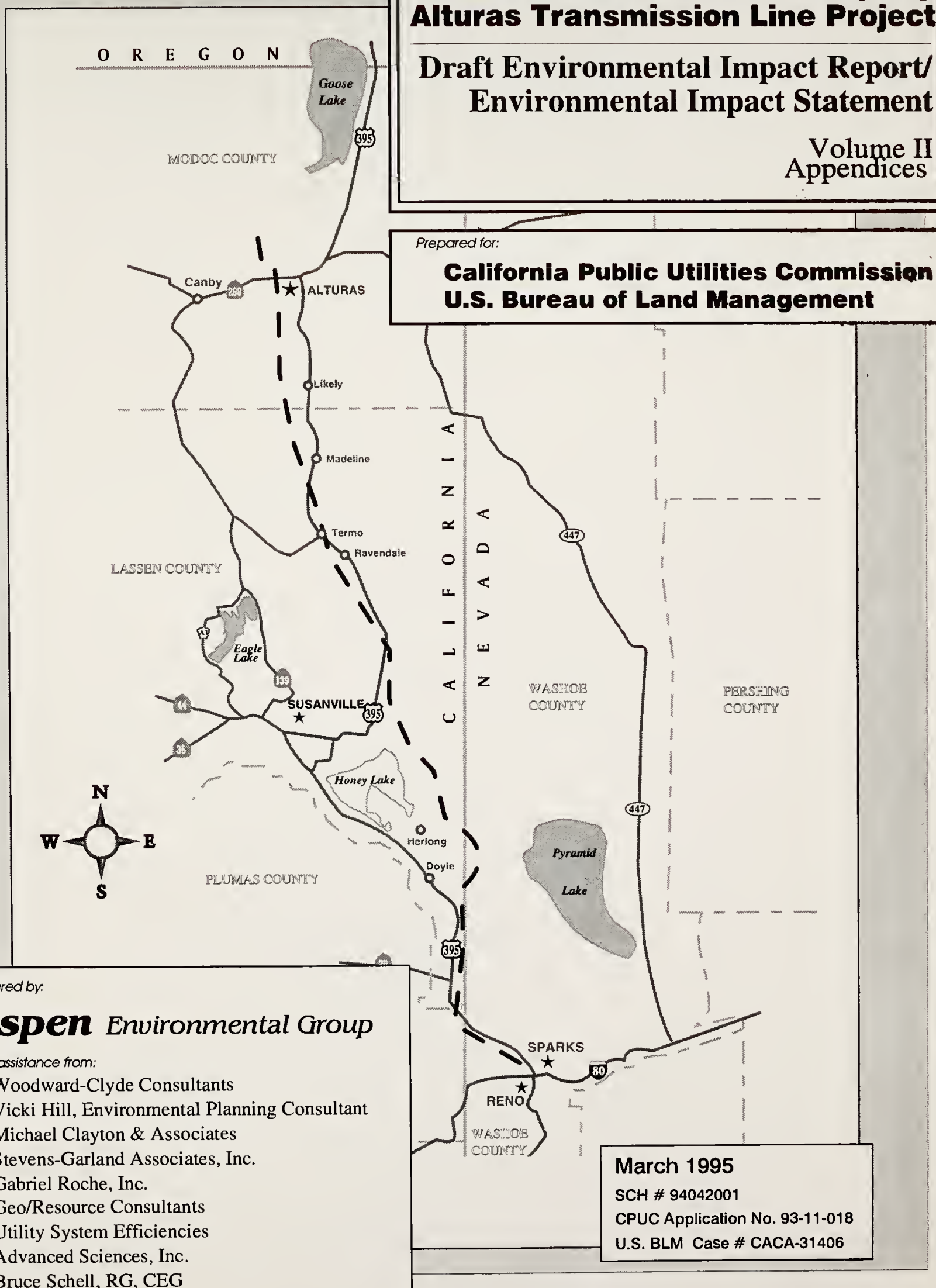
Sierra Pacific Power Company
Alturas Transmission Line Project

Draft Environmental Impact Report/ Environmental Impact Statement

Volume II
Appendices



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APPENDIX A

GLOSSARY/ABBREVIATIONS

LIST OF PREPARERS AND QUALIFICATIONS

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APPENDIX A

GLOSSARY AND ABBREVIATIONS

4WD
Four-wheel Drive

100-Year Flood
A stream flow caused by a discharge that is exceeded, on the average, only once in 100 years. A 100-year flood has a 1% chance of occurrence in any given year.

AAQS
Ambient Air Quality Standard; a federal and state measure of the level of air contamination that is not to be exceeded in order to protect human health.

ACE
Assessment of Chemical Exposure.

ac-ft
Acre foot; a unit of measure for water demand and supply. The volume of 1 acre foot would cover 1 acre to a depth of 1 foot and is equal to 325,851 gallons.

ACHP
U.S. Advisory Council on Historic Preservation.

Acid Fog
Airborne moisture, with acidic chemical balance, made so by the contaminants it contains.

ACSR
Aluminum Conductor, Steel Reinforced

ADT
Average Daily Traffic; number of vehicles traveling per normal day on a roadway.

Aerosol
Wet or dry small particles in the atmosphere. Also called "particulate matter."

Aggradation (Of a Stream Channel Bed)
Raising of stream bed elevation, caused by sediment supply in excess of sediment-transport capacity.

Air Quality Standard
The specified average concentration of an air pollutant in ambient air during a specified time period, at or above which level the public health may be at risk; equivalent to AAQS.

Algae
A collective term for several taxonomic groups of primitive chlorophyll-bearing plants which are widely distributed in fresh and salt water and moist lands. This term includes the seaweeds, kelps, diatoms, pond scums, and stoneworts.

Ambient Air
Any unconfined portion of the atmosphere; the outside air.

Ambient Noise Level
Noise from all sources, near and far. ANL constitutes the normal or existing level of environmental noise at a given location.

ANSI
American National Standards Institute

Anti-cyclone
Clockwise circulation of air about a high-pressure center.

Antidunes
Ripple bed forms that occur in rapidly-flowing alluvial channels.

APCD
Air Pollution Control District; a regional government bureau responsible for attainment and management of air quality standards through permitting and regulating of the emission sources.

APEFZ
Alquist-Priolo Earthquake Fault Zone

APN
Assessor Parcel Number, given to a parcel, or a specified area, of land by County tax assessors.

AQAP
Air Quality Attainment Plan; equivalent to Air Quality Management Plan (AQMP), which outlines rules and regulations for improving and maintaining the quality of air in the region.

ARB
Air Resources Board

Arroyo
A stream channel or gully in arid country, usually with steep banks, dry much of the time.

ASME
American Society of Mechanical Engineers.

ASTM
American Society for Testing Materials.

ATC
Authority to Construct. A permit required by local air quality regulatory agencies before construction of a major emission source is started.

Atmospheric Stability
The resistance to or enhancement of vertical and horizontal air movement, which regulates the amount of air exchange and affects pollution concentration or dispersion.

ATV
All-Terrain Vehicle

Average
As a measure, the sum of the measurements (over a specified period) divided by the number of measurements.

Avifauna
Birds.

A-Weighting
A frequency measure of noise which simulates human perception.

B.P.
Before Present

Backfill
Earth that is replaced after a construction excavation.

Backhoe
A self propelled machine with an arm equipped with a toothed shovel that scoops earth as the shovel is pulled toward the machine.

BACT
Best Available Control Technology; the most improved devices or air emission reduction technology currently available for controlling pollutant emissions.

Barranca
A ravine caused by rain, or a water course.

Baseline
A set of existing conditions against which change is to be described and measured.

Bed Forms
Local topographical interruptions to the uniformity of a channel bed occurring during the passage of a stream flow. Antidunes are an example of bed forms.

Berm
A narrow shelf, path, or ledge typically at the top or bottom of a slope; also, an earthen, mounded wall.

Biota
Living organisms.

BLM
U.S. Bureau of Land Management

BMP
Best Management Practice

BOD
Biological Oxygen Demand; the free oxygen-removing capability of biologically derived materials in the environment.

BP
British Petroleum.

BPA
Bonneville Power Administration

Brackish
Pertaining to water, generally estuarine, in which the salinity ranges from 0.5 to 17 parts per thousand by weight.

Btu
British thermal unit, a measurement of energy, the amount of energy that can be obtained as heat by combusting approximately 1/1000 cubic feet of natural gas.

CAAQS
California Ambient Air Quality Standard; see AAQS.

CAL OSHA
California Occupational Health and Safety Administration

Caltrans
California Department of Transportation.

CAPCOA
California Air Pollution Control Officers Association.

CARB
California Air Resources Board, sometimes abbreviated as ARB.

Cathodic protection
An anticorrosion technique for metal installations; pipelines, tanks, and buildings in which weak electric currents are established to offset the current associated with metal corrosion.

Cathodic protection rectifier
The rectifier converts alternating current power supply into direct current output. This output is connected to a buried anode which produces an electrical current through the soil and into the pipeline, which is thus placed under cathodic protection.

CCAA
California Clean Air Act.

CCD
Census County Division.

CCR
California Code of Regulations

CDF
California Department of Forestry and Fire Prevention

CDFG
California Department of Fish and Game.

CDMG
California Division of Mines and Geology

CEQA
California Environmental Quality Act.

CFR
U.S. Code of Federal Regulations

cfs
cubic feet per second

Chaparral
Dense thicket of shrubs and small trees, characteristic of southwestern U.S.

Channel Lining
Artificial hardening of the sides and/or bed of a stream channel to prevent erosion. Concrete, soil cement and rock riprap are typical channel linings.

Chemoreception
Ability to react to and differentiate between different chemical stimuli, such as through taste and smell.

Closed loop control
When referring to computers, a term meaning complete control is vested in the computer.

CNDDB
California Natural Diversity Data Base

CNEL
Community Noise Equivalent Level; the averaging of noise levels on a measurement scale of decibels that increases the actual noise measurement, to account for an increased sensitivity to noise during late evening, nighttime, and morning hours (the increments are 5 dB from 7 to 10 pm and 10 dB from 10 pm to 7 am).

CNPS
California Native Plant Society.

CO
Carbon Monoxide; a colorless, odorless, toxic gas produced by incomplete combustion of carbon in fossil fuels.

COD
Chemical Oxygen Demand; the free oxygen-removing (combining) capability of chemical substances in liquid.

Concentration
The relative content of a component (as dissolved or dispersed material) and measured by weight or volume of material per unit of volume of the medium.

Concentration, average
The average of a series of measurements of concentration.

Concentration, maximum
The highest individual or average measurement of concentration.

Control Area
A portion of the interconnected electricity system grid whose operations and procedures are controlled and managed by a single utility. This utility typically owns most of the facilities in its control area and is responsible for the physical interaction with neighboring control areas.

Control panel
An assembly of indicators and recording instrument; pressure gauges, warning lamps, and other visual or audible signals for monitoring and controlling a system.

Corrosivity
Is an estimate of the potential for soil-induced chemical action that dissolves or weakens uncoated shell.

CPCN
Certificate of Public Convenience and Necessity

CPR
Cardiac/pulmonary resuscitation

CPUC
California Public Utilities Commission

CRMP
Cultural Resource Management Plan

CSC
California Species of Concern.

Cultural Resource
Places or objects important for scientific, historical, and religious reasons to cultures, communities, and individuals.

CWA
Clean Water Act

Cyclonic
An large air mass circulating counterclockwise, in northern hemisphere.

dBA
The A-weighted decibel scale representing the relative insensitivity of the human ear to low-pitched sounds; decibels are logarithmic units that compare the wide range of sound intensives to which the human ear is sensitive.

Decibel (Db)
A logarithmic unit which measures the pressure levels of sounds.

Degradation (Of a Stream Channel Bed)
Lowering of stream bed elevation, caused by sediment-transport capacity in excess of the sediment supply. Degradation can be long-term (after the passage of many stream flows) or short-term (caused by a single stream flow).

DEIR
Draft Environmental Impact Report (see EIR).

Diffusion model
A model, calculated by formula, graphs, or computer, that estimates the dilution of an air pollutant as it is carried downwind. The models are based on physical principles with various simplifications to aid solvability.

DOI
U.S. Department of the Interior; a federal Department that includes the following agencies: BLM, USFWS, Bureau of Mines, Bureau of Reclamation, etc.

DOT
U.S. Department of Transportation

DSM
Demand Side Management, for example, home insulation, energy efficient appliances, etc.

DWP
Department of Water and Power.

DWR
California Department of Water

Ecotonal
Biological term describing the geographic boundary between two ecological habitats.

EIR
Environmental Impact Report; an environmental impact assessment document prepared in accordance with the California Environmental Quality Act (CEQA).

EIS
Environmental Impact Statement; an environmental impact in accordance with the National Environmental Policy Act (NEPA).

EIR/S
Environmental Impact Report and Statement, prepared as a single document for submission to both the state and federal governments and for public review. See EIR.

EMF
Electric and Magnetic Field

Emission
Unwanted substances released by human activity into air or water.

Emission, primary
An emission that is treated as inert (non-reactive).

Emission, secondary
Unwanted substances that are chemical byproducts of reactive primary emissions.

Emission Control Device
Any piece of equipment that reduces the release of any air pollutant into the atmosphere; see BACT.

Emission Limit
A regulatory standard that restricts the discharge of an air pollutant into atmosphere.

EPA
U.S. Environmental Protection Agency; a federal agency that works to protect the environment.

EQAP
Environmental Quality Assurance Program; a generic term for mitigation monitoring.

ERP
Electric Resource Plan, required by the Public Service Commission of Nevada every three years.

ESH
Environmentally Sensitive Habitat; an area designated by governmental agencies as requiring special administration or protection.

ESHA
Environmentally Sensitive Habitat Area; an area designated by governmental agencies as requiring special administration or protection.

Estuary
Widening area at seaward end of river where its current is met and influenced by ocean tides.

Ethnohistoric
Ethnological information collected during historic times, for instance, that from the Spanish mission registers.

Export Capability
The capacity or extent to which a utility or electric control area can sell electric power outside its electric system at a given time or during a given set of conditions using all available facilities.

Fault
A fracture or zone of fractures in rock strata which have undergone movement that displaces the sides relative to each other, usually in a direction parallel to the fracture. Abrupt movement on faults is a cause of most earthquakes.

fbg
feet below grade

FEIR
Final Environmental Impact Report. The Final EIR includes all comments made to the Draft EIR as well as the responses of the proposer to those comments and is submitted to the state government and the public for review of a proposed project.

FEIR/S
Final Environmental Impact Report/Statement; last version of document submitted to both state and federal governments. See FEIR.

FEMA
Federal Emergency Management Agency

FERC
Federal Energy Regulatory Commission

Firm Purchases
Contractual procurement of electric energy which is intended to have assured availability to the customer.

Flora
Plants or plant life.

FRA
Federal Railway Administration

Fugitive dust
Airborne pulverized soil particles.

FTE
Full-time equivalent.

g
(a) gram; (b) gravities, a unit of acceleration equal to that produced on free falling bodies at the earth's equator.

Gaussian
A diffusion model named after the mathematician Gauss for representing pollution plumes. A statistical formulation of pollutant concentration in the downwind direction and the lateral spreading of the pollutants, based on the wind speed and stability of the atmosphere. Modified in various ways to take into account presence of an inversion layer and gravitational settling of particles in the plume.

General Scour
Degradation of a channel bed as a result of imbalance of channel sediment-transport capacity and supply during a single stream flow.

Generation
The production of electricity from other forms of energy such as combustion, falling water or thermal transfer.

Generation Capacity
Maximum electric production limit for which a generator is rated. The maximum limit fluctuates with changes in temperature or other environmental circumstances, depending on the type of machine.

Geophysical Survey
General term for survey of land forms using geologic mapping, trenching, soil testing, percolation testing, echo sounding, or other techniques.

GIS
Geographic Information System

gpd
Gallons per day; a measure of flow rate.

gWh
Gigawatt-hour; A measure of electric energy. One million kilowatt-hours.

Harney
Harney Electric Cooperative, Inc.

Hazard Index
The estimated exposure to a given substance being discharged from a facility divided by the acceptable exposure level for that substance summed over all pollutants.

HC
Hydrocarbons; a mixture of hydrocarbon compounds usually referred to in the vapor state.

Herpetofauna
Biological term for reptiles.

Herpetologist
Person who studies reptiles.

High flow
High volumes of water, as into an estuary, produced by copious runoff after period of heavy rainfall.

HLFZ
Honey Lake Fault Zone

HMA
Housing Market Area; see Socioeconomics.

Horsepower
A unit of power equivalent to 33,000 foot-pounds per minute or 745.7 watts of electricity.

Hydrocarbons, nonmethane
Mixture or concentration of hydrocarbons with the methane fraction ignored. One of many formulations for reactive hydrocarbons.

Hydrocarbons, reactive
Mixture or concentration of hydrocarbons with fraction assumed to be nonreactive removed from consideration. See VOC.

Import Capability
The capacity or extent to which a utility or electric control area can purchase electric power from outside its electric system at a given time or during a given set of conditions using all available facilities.

Imports
The purchase of electricity by a utility from another utility outside its electric system.

Inventory, emission
A list of daily or annual emissions, listed by pollution source category (e.g., trains, refineries, agriculture, etc.).

Inversion
A layer of air in the atmosphere in which the temperature increases with altitude at a rate greater than normal (adiabatic). Pollutants tend to be trapped below the inversion.

Invertebrate
Animals that lack a spinal column.

IPC
Idaho Power Company

IPP
Intermountain Power Project

ISCST
Industrial Source Complex (short term); an EPA-approved computer air quality module.

Isobath
Contour line that is at equal depth along its length.

KGRA
Known Geothermal Resource Area

km_2
Square kilometer.

KOP
Key Observation Point; one or a series of points on a travel route or at a use area where the view of the proposed project would be most revealing.

kV
Kilovolt. A measure of electric voltage, one thousand volts.

Kwh
Kilowatt hour

L_{10}
An average of noise levels that are exceeded 10 percent of the time during the measurement period.

L_{eq}
Average level of sound determined over a specific period of time.

L_{dn}
The average ambient noise level in dBA with levels between 10 p.m. and 7 a.m. increased by 10 dBA.

LADWP
Los Angeles Department of Water and Power

Lateral Erosion
Horizontal movement of a channel bank, or channel widening, caused by water-transport of bank material.

LCAPCD
Lassen County Air Pollution Control District

Lead Agency
For the proposed Alturas Transmission Line Project, the CPUC and BLM are the State and Federal Lead Agencies, respectively.

Liquefaction
The process of making or becoming liquid (soils).

LFZ
Likely Fault Zone

LMUD
Lassen Municipal Utility District

Load Centers
Major areas of electricity consumption such as large cities or large industrial facilities.

Local Scour
Lowering of a channel bed as a result of a local disturbance to flow, such as bridge piers, a sudden drop or a sharp channel bend.

LOS
Level of Service; a measure of roadway congestion, ranging from A (free flowing) to F (highly congested).

Low flow
Low rate of water flow due to scant rainfall and low runoff.

Low-Flow Incisement
Formation of a local, small channel inside a larger stream channel as a result of low-discharge flows.

LUST
Leaking underground storage tank

m
Meter, length equal to 30.48 inches.

Macroinvertebrate
Pertaining to invertebrates that are visible to the naked eye.

Macroalgae
Pertaining to large algae, such as kelp, as distinguished from microscopic algae.

MCAPCD
Modoc County Air Pollution Control District

Median
The mid-value is a series of values, with half having greater value and half lower value. To be distinguished from "average."

Medicine Wheel
Native American religious symbol, which assembles large rocks in a great circle.

MEI
Maximum Exposed Individual; see Air Quality.

Meteoric Water
Water derived from the atmosphere, such as rain water.

MGD
Million gallons per day

Microclimate
Distinctive climate within a small geographic area.

Micron
One millionth of a meter

Microwave
Radio communications which are of sufficiently short wavelength (or high frequency) as to be focused on a line-of-sight between sending and receiving equipment. These radio signals carry information for control purposes.

Milligauss (mG)
Measurement of magnetic field strength.

Mixing height
The distance from the ground to a daytime (temperature) inversion layer.

MJUSD
Modoc Joint Unified School District

Monitoring station
A mobile or fixed site equipped to measure instantaneous or average ambient air pollutant concentrations.

Multipathway Pollutants
Pollutants that pose a risk to public health through individual inhalation, ingestion (from food, water, or soil) or dermal absorption.

MW
Megawatt; a measure of electric power. One thousand kilowatts or one million watts.

MWD
Metropolitan Water District

NAAQS
National Ambient Air Quality Standards; see AAQS.

NACE
National Association of Civil Engineers

Native Generation
Electricity generation within a utilities service area.

NBMG
Nevada Bureau of Mines and Geology

NCF
Nelson Corral Fault

NDOT
Nevada Department of Transportation

NDOW
Nevada Division of Wildlife

NEPA
National Environmental Policy Act

NERC
National Electric Reliability Council

NESC
National Electrical Safety Code

Nevada AAQS
Nevada Ambient Air Quality Standards

NHPA
National Historic Preservation Act.

Nitrogen oxides
A gaseous mixture of nitric oxide (NO) and nitrogen dioxide (NO_2) and symbolically represented as NO_3).

NO
Nitric oxide. A molecule of one nitrogen and one oxygen atom. Results usually from combustion of organic substances containing nitrogen and from recombination of nitrogen decomposed in air during high temperature combustion.

NO_2
Nitrogen Dioxide. A molecule of one nitrogen and two oxygen atoms. Result usually from further oxidation of nitric oxide (NO) in the atmosphere. Ozone accelerates the conversion.

NO_x
Nitrogen Oxides; poisonous and highly reactive gases produced when fuel is burned at high temperatures, causing nitrogen in the air to combine with oxygen.

Noise level, median
The level of noise exceeded 50 percent of the time. Usually specified as either the daytime or the nighttime median noise level. Also given the designation L_{50}.

Non-firm Purchases
Electric energy purchases having limited or no assured availability.

Non-utility Owned Generation
Generation which is possessed by a entity not in the business for the sale of electricity at retail.

NPDES
National Pollutant Discharge Elimination System

NPP
Northwest Power Pool

NPPA
Native Plant Protection Act.

NSR
New Source Review; see Air Quality.

NWPRR
Northwestern Pacific Railroad

NWR
National Wildlife Refuge

O_3
Ozone; a colorless gas formed by a complex series of chemical and photochemical reaction of reactive organic gases, principally hydrocarbons, with the oxides of nitrogen, which is harmful to the public health, the biota and some materials.

OES
Office of Emergency Services

OHV
Off-Highway Vehicle

ORV
Off-Road Vehicles

OSF&G
Open Space, Forestry, and Grazing

OSHA
U.S. Occupational Safety and Health Administration, a federal agency regulating the health safety of the work place.

Oxidant
A mixture of chemically oxidizing compounds formed from ultraviolet stimulated reactions in the atmosphere, with ozone a principal fraction.

Ozone
A molecule of three oxygen atoms -- O_3 A principal component of "oxident" in photochemically polluted atmospheres.

PA
Programmatic Agreement

PacifiCorp
Pacific Gas and Electric Company

PAH
Polyaromatic hydrocarbons; hazardous air pollutants.

Particulate matter (particulates)
Very fine sized solid matter or droplets, typically averaging one micron or smaller in diameter. Also called "aerosol."

PEA
Proponent's Environmental Assessment; required by CPUC when filing application for CPNC.

PG&E
Pacific Gas and Electric Company

Ph
A measure of acidity or alkalinity.

Photochemical Pollutant
Reactive organic compounds (ROC) and nitrogen oxides (NOx), photochemical pollutants that absorb energy from the sun and react chemically to form ozone (O_3).

Phytoplankton
Microscopic plants that form the base of the marine/aquatic food chain.

Pipeline Corridor
Fifty- to two hundred-foot strip of land for installation of the proposed Tuscarora pipeline. It can be part of a utility corridor containing other linear utility systems.

Planning Reserves
As required by WSCC Operating Criteria, WSCC member utilities must have standby generation capacity, in addition to existing demand requirements, to insure an adequate level of service.

PM_{10}
Particulate matter less than 10 micron in size, which is small enough to be inhaled deeply into the lungs and cause disease.

PMRP
Paleontological Mitigation Resource Plan

Pool Agreements
Agreements among utility alliance members (e.g., WSCC and NPP) for the sharing of resources or satisfaction of operation and reliability criteria.

ppb
Parts per billion, a measure of the amount of one substance in a second, which is the carrier.

PP&L
Pacific Power and Light Company

ppm
Parts per million, a measure of the amount of one substance found in a carrier.

ppt
Parts per thousand, a measure of the amount of one substance found in a carrier.

PSCN
Public Service Commission of Nevada

PSD
Prevention of Significant Deterioration; a federal set of limits on emissions of sulfur oxide and particulates to protect air quality in non-urban area.

psi
Pounds per square inch.

Psig
The gauge value of pressure in pounds per square inch.

PTO
Permit to Operate; Granted by the APCD after source testing and validation of permits.

Pycnocline
A steep vertical gradient of density.

Qa
Alluvium

Qc
Collivium

QDG
Quaternary Faults of Devil's Garden

Ql
Lake deposits

Rating
Maximum operation limit of transmission or generation facilities, as established by WSCC and/or NPP operating and reliability criteria guidelines. Utility facilities and interconnections can be rated either for individual or simultaneous operation, where simultaneous operations take into consideration collective WSCC or NPP utilities.

Reactive Power
A component of power production that is not sold.

Riparian
Area along the banks of a river or lake supporting specialized plant and animal species.

Riprap
A foundation constructed of broken stones or boulders loosely placed or thrown together, as in deepwater, on a soft bottom, or as a seawall to protect against erosion.

RMP
Resource Management Plan

RNA
Research Natural Area

ROC
Reactive Organic Compounds (see Air Quality) that are chemically sensitive to the ultraviolet light in sunlight.

ROD
Records of Decision

ROW
Right of way; an easement, lease, permit, or license across an area or strip of land to allow access or to allow a utility to pass through public or private lands.

RTU
Remote Terminal Units; a device that takes data from field transmitters that detect pressure, temperature and other parameters.

Ruderal
Growing where the natural vegetation cover has been disturbed.

RWQCB
Regional Water Quality Control Board

SCADA
Supervisory Control and Data Acquisition System; data-gathering system for the operation of the pipeline.

SCAPCD
Sierra County Air Pollution Control District

SCAQMD
South Coast Air Quality Management District

SCE
Southern California Edison.

SCF
Standard cubic foot; a measure of volume or rate of flow of liquid.

SCS
Soil Conservation Service

SEA
Significant Ecological Area; an area containing an ecosystem of value and requiring government protection.

Seedbank
The layer of topsoil containing native plant seed material, which is frequently used as a "seed bank" for revegetation of native plants.

Self-Owned or Utility-Owned Generation
Generation which is possessed by a utility.

Sensitive Receptor
Land uses adjacent to or within proximity to the Proposed Project that could be impated by construction, operation, and maintanence activities

Shrink-swell potential
The expansion or contraction of primarily clay-rich soils during alternating wetting and drying cycles.

SIAD
Sierra Army Depot, U.S. Dept. of Defense.

SHPO
State Historic Preservation Office

SIP
State Implementation Plan (see Air Quality); a document required periodically from each county by EPA that indicates the progress and the planning of the county for improving the quality of its air.

SIRP
Socioeconomic Impact Recovery Plan.

SLC
State Lands Commission; the California agency that manages state-owned lands, such as the zone between mean high tide and the land lying offshore within the three-mile limit.

SO_x
Sulfur oxides. The group of compounds formed during combustion or thereafter in the atmosphere of sulfur compounds in the fuel, each having various levels of oxidation, ranging from two oxygen atoms for each sulfur atom to four oxygen atoms.

SO_2
Sulfur Dioxide; a corrosive and poisonous gas produced from the complete combustion of sulfur in fuels.

SOR
System Operation Review

SPPCo
Sierra Pacific Power Company

SPTC
Southern Pacific Transportation Company

SSZ
Special studies zone.

Stream Scour
Lowering of a stream bed during the passage of a single stream flow. Stream scour can be local in nature (see Local Scour) or more wide-spread (see General Scour).

Substrate
Geologic term describing soil or geologic layers underlying the ground surface.

Sulfates
Compounds in air or water that contain four oxygen atoms for each sulfur atom. See SO_x.

Sulfur oxides
A gaseous mixture of sulfur dioxide (SO_2) and sulfur trioxide (SO_3) and symbolically represented as SO_x. Can include particulate species such as sulfate compounds ($-SO_4$).

SVE
Surprise Valley Electrification Corporation

SVFZ
Surprise Valley Fault Zone

SWPPP
Storm Water Pollution Prevention Plan

TA
Technical Appendix.

TAC
Toxic Air Contaminants.

TC
Transportation corridor.

TCM
Transportation Control Measures.

TDM
Transportation Demand Management; a system of analysis designed to reduce traffic levels and thereby reduce air pollution.

TDPUD
Truckee Donner Public Utility District

TDS
Total Dissolved Solids

Terrestrial
Related to or living on land. Terrestrial biology deals with upland areas as opposed to shorelines or coastal habitats.

tpd
Tons per day.

Transmission Service Customers
Wholesale electricity utilities or other entities which pay for the use of another utility's facilities to transmit electric power from one point to another.

TSP
Total Suspended Particulates; solid or liquid particles small enough to remain suspended in air. PM_{10} is the portion of TSP that can be inhaled.

Turbidity
Cloudiness or muddiness of water, resulting from suspended or stirred up particles.

ug/m^3
Millionths of a gram per cubic meter, a unit of concentration in liquids or gases.

UBC
Uniform Building Code

UEPA
Utility Environmental Protection Act involving the permitting requirements of the Public Service Commission of Nevada.

UPRR
Union Pacific Railroad

UPRS
Union Pacific Railroad System

USACE
U.S. Army Corps of Engineers

USCS
Unified Soils Classification System

USDA
U.S. Department of Agriculture

USFS
U.S. Forest Service

USFWS
U.S. Fish and Wildlife Service.

Utility Corridor
A strip of land, or an easement, on which utility facilities such as powerlines and pipelines are constructed.

VC
View Corridor. An area from which splendid vistas may be seen.

V/C
Volume to Capacity ratio; a measure of the capacity of a roadway. When V/C is 100 percent, no more traffic can be accommodated.

Vertical Stratification
Corresponding to a natural arrangement of layers within the water column of the ocean that vary with depth.

Viscosity
Term applied to a fluid indicating its resistance to sheer. In common terms, how "sticky" the fluid.

Visual sensitivity
Consideration of people's uses of various environments and their concerns for maintenance of scenic quality and open-space values; examples of areas of high visual sensitivity would be areas visible from scenic highways, wilderness areas, parks, recreational water bodies, etc.

VMT
Vehicle miles travelled, usually per day.

vpd
Vehicles per day; see Transportation.

VRM
Visual Resource Management

VRS
Vapor Recovery System.

Watershed
The area contained within a drainage divide above a specified point on a stream.

Wells
Wells Rural Electric Company

Wetland
Lands transitional between obviously upland and aquatic environments. Wetlands are generally highly productive environments with abundant fish, wildlife, aesthetic, and natural resource values. For this reason, coupled with the alarming rate of their destruction, they are considered valuable resources, and several regulations and laws have been implemented to protect them.

Wheeling
An electric operation wherein transmission facilities of one system are utilized to transmit power of another system.

WSCC
Western System Coordinating Council

WSF
Water Soluble Fraction.

WSVFZ
Warm Springs Valley Fault Zone

WUG
Western Utility Group

WWP
Washington Water and Power

Zooplankton
Microscopic marine/aquatic animals generally carried within a water mass.

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Appendix B
Scoping & Noticing

APPENDIX B

Introduction

Appendix B consists of the EIR/S Scoping Report, a summary of comments received subsequent to the EIR/S Scoping Period (Table B-1), and the EIR/S Public Notice on the possible future connection to the Lassen Municipal District (LMUD) to the Alturas Transmission Line.

The EIR/S Scoping Report describes the purpose of scoping, the scoping process, the scoping meetings, and provides a list of commentors. This report also includes issues of concern, alternatives, and suggested mitigation measures that the EIR/S should address as identified by parties commenting on the Notice of Preparation (NOP) and Notice of Intent (NOI), by verbal comments received at scoping meetings, and by other written comments. The exhibits of the Scoping Report include the NOP, NOI, Scoping Meeting Handout, CPUC Decision-Making Process Sheet, BLM/FS Decision-Making Process Sheet, Project Study Area Map, Mailing List Registration Form, Speaker Registration Card, EIR/S Environmental Issues Questionnaire, and the Notice of Public Scoping Meetings. The Scoping Comment Letters and the Scoping Meeting Transcripts are separately bound and available upon request.

Table 2-1 lists commentors by name and the date of their written comments as submitted to the CPUC/BLM. The areas of concern to each commentor are also represented by check marks under the various issue areas. Copies of these comments are available upon request.

The LMUD Public Notice informing the public about the inclusion of an analysis of the potential LMUD connection to the Alturas Transmission Line in the EIR/S. This notice was sent to the EIR/S mailing list consisting of approximately 1300 names.

PROPOSED ALTURAS TRANSMISSION LINE PROJECT

ENVIRONMENTAL IMPACT REPORT/
ENVIRONMENTAL IMPACT STATEMENT

SCOPING REPORT

Prepared for:

California Public Utilities Commission
U.S. Bureau of Land Management

Prepared by:

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June 21, 1994

CALIFORNIA PUBLIC UTILITIES COMMISSION
ALTURAS TRANSMISSION LINE EIR/S

SCOPING REPORT
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1. INTRODUCTION

Sierra Pacific Power Company (SPPCo) has proposed the construction and operation of a 345,000 volt (345 kV) overhead electric power transmission line from Alturas, California to Reno, Nevada. In their consideration of SPPCo's applications for the proposed project, the California Public Utilities Commission (CPUC) and the U.S. Bureau of Land Management (BLM) are preparing an Environmental Impact Report (EIR) under the California Environmental Quality Act (CEQA), and an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA). The joint CEQA/NEPA document will be referred to as the EIR/S and will assess the potential environmental impacts of the proposed project and alternatives. The CPUC has contracted with an independent consulting firm, Aspen Environmental Group (Aspen), to prepare the EIR/S under the direction of CPUC and BLM.

The following Scoping Report is a summary of the issues and concerns from the public and various agencies. Comments were submitted in written form, and verbal comments were given at the four scheduled scoping meetings in Susanville, Alturas, and Loyalton, California, and Reno, Nevada.

1.1 PURPOSE OF SCOPING

The EIR/S on the proposed Alturas Transmission Line Project will focus on significant environmental effects. The process of determining the focus and content of the EIR/S is known as scoping. Scoping helps to identify the range of actions, alternatives, environmental effects, and mitigation measures to be analyzed in depth, and eliminates from detailed study those issues that are not pertinent to the final decision on the proposed project. Scoping is also an effective way to bring together and address the concerns of the public, affected agencies, and other interested parties. Significant issues may be identified through public and agency comments.

Scoping, however, is not conducted to resolve differences concerning the merits of the project or to anticipate the ultimate decision on the proposal. Rather, the purpose of scoping is to help ensure that a comprehensive and focused EIR/S will be prepared that provides a firm basis for the decisionmaking process.

The intent of the Alturas Transmission Line EIR/S scoping process is to:

1) Inform the agencies and interested members of the public about the proposed project and the CPUC and BLM's actions in relation to it, including compliance with CEQA and NEPA requirements

2) Identify the range of concerns and project-related issues that form the basis for identification of significant envrionmental issues to be addressed in the EIR/S

3) Identify a range of alternatives to the proposed project which may be considered in the EIR/S

4) Identify suggested mitigation measures or ideas and approaches to mitigation that may be useful and explored further in the EIR/S

5) Develop a mailing list of agencies and individuals interested in the future actions relative to the EIR/S.

1.2 SCOPING PROCESS

The scoping process for the Alturas Transmission Line EIR/S consists of four elements:

1) Issuance of a Notice of Preparation (NOP) soliciting comments from public agencies, as required by CEQA

2) Issuance of a Notice of Intent (NOI) soliciting comments from public agencies, as required by NEPA

3) Public scoping meetings

4) Summarization of scoping comments in this Scoping Report

5) Distribution of the Report and scoping comments as appropriate to EIR/S team members for use in work planning and impact analysis.

1.2.1 Notice of Preparation/Notice of Intent

The CPUC issued the NOP on March 17, 1994 (Exhibit A), and distributed it to the State Clearinghouse and other city, county, state and federal agencies. There was a 30-day legally required period for interested parties to submit comments regarding the content of the EIR/S. The BLM issued the NOI on March 30, 1994 (Exhibit B), filed a copy of it with the Federal Register, and it appeared in the Federal Register on March 24, 1994. The NOI was also sent to various public agencies for solicitation of comments on the contents of the EIR/S.

1.2.2 Scoping Meetings

Locations. Four public scoping meetings were conducted:

- May 17, 1994 at 6 p.m. in Susanville
- May 18, 1994 at 6 p.m. in Alturas
- May 19, 1994 at 6 p.m. in Reno/Sparks
- May 25, 1994 at 6 p.m. in Loyalton.

Notices of the scoping meetings were posted in local newspapers in advance of their occurrence. In addition, a scoping meeting for government agencies was held on May 19, 1994 at 3:00 p.m. in Reno/Sparks.

Presentation. The same format was followed at each public scoping meeting as follows:

- Julie Halligan, the CPUC Project Manager, and Peter Humm, the BLM Project Manager introduced the meeting's panel, described the project briefly, explained the respective roles of their agencies in the review process, and discussed the purpose of scoping.
- Gary Meunier, Aspen Project Manager, described the EIR/S preparation process, the proposed project, and the various environmental issue areas which will be addressed in the EIR/S

- Julie Halligan opened the floor to questions and comments to address issues, concerns, alternatives, and mitigation measures for consideration in the EIR/S from the public which were recorded by the court reporter

- Julie Halligan and Gary Meunier described how the public can participate throughout the environmental review process, including future opportunities for public involvement

- Julie Halligan and Peter Humm made closing comments and thanked the meeting attendees for their comments.

Meeting Handouts. Informational materials were made available at each meeting including:

- A Scoping Handout that addressed the purpose of scoping, the schedule of public scoping meetings, EIR/S task flow, potential environmental issues, project description, future opportunities for public involvement, and the lead agencies' parallel environmental review processes (Exhibit C)

- The CPUC's Decision-Making Process (Exhibit D)

- BLM and FS Decision-Making Process for Major Power Line Projects (Exhibit E)

- Project Study Area Map (Exhibit F)

- Mailing List Registration Form (Exhibit G)

- Speaker Registration Card (Exhibit H)

- EIR/S Issues Questionnaire (Exhibit I)

- Notice of Public Scoping Meetings (Exhibit J).

At each meeting all speakers who wished to address the scoping panel filled out the *Speaker Registration Card*. A five minute time limit was suggested for comments, but the amount of participation was such that no speaker was prevented from speaking as long he/she desired. Attendees were also invited to submit comments in writing or fill out the *EIR/S Issues Questionnaire*. The deadline for submitting written comments and questionnaires was identified as May 27, 1994.

1.2.3 Participants and Attendees

Attendance varied for each meeting. In general, the majority of the people attending the meetings signed in upon entrance to the meeting. The following is a brief summary of each meeting:

Susanville, May 17, 1994

- 36 names on the sign-in sheet

- 17 commentors entered onto public record

- 16 names entered for the EIR/S Project Mailing List.

Alturas, May 18, 1994

- 58 names on the sign-in sheet
- 13 commentors entered onto public record
- 29 names entered for the EIR/S Project Mailing List.

Reno/Sparks, May 19, 1994

- 21 names on the sign-in sheet
- 14 commentors entered onto public record
- 13 names entered for the EIR/S Project Mailing List.

Loyalton, May 25, 1994

- 5 names on the sign-in sheet
- 5 commentors entered onto public record
- 0 names entered for the EIR/S Project Mailing List.

2. MATRIX OF COMMENTS, BY COMMENTOR AND ENVIRONMENTAL ISSUE AREA

All comments were reviewed and organized for this report. Table 2-1 lists commentors by the meeting location at which they attended and made verbal comments at, and/or by the date of their written comments submitted to the CPUC/BLM. The areas of concern to each commentor are also represented by check marks under the various issue areas. The written scoping comment letters are separately bound and available upon request. Copies of the scoping meeting transcripts (verbal comments) are available upon request.

Table 2-1 Matrix of Comments, by Commentor and Environmental Issue Area

Commentor	Meeting Location	Date of Letter/ Comment	Project Descrip. tion/ Purpose/ Need	Alter-natives	Air	Biology	Cultural	Energy/ Utilities	Geology/ Soil/ Paleon-tology	Hydro-logy	Land	Noise	Public Safety/ Health	Socio-economics/ Public Services	Trans-portation Traffic	Visual	Cumula-tive/ Growth Induce-ment
Citizen Groups																	
California Wilderness Coalition		5/06/94	✓			✓											
Citizens for the Preservation of Long Valley (Loverin)		5/14/94	✓				✓				✓		✓	✓		✓	✓
Lassen County Chamber of Commerce		5/12/94												✓			
Lassen Motorcycle Club		5/27/94									✓						
Lyneta Farms		5/20/94											✓				
Neighbors Opposing Power Encroachments (N.O.P.E. Petition)		5/17/94	✓														
Novy Ranches		5/11/94	✓								✓						
Pit River Land & Cattle Co. (Carlos Aparicio)		5/22/94	✓			✓											
Pit River Land & Cattle Co. (Thomas F. Boxler)		5/16/94	✓			✓											
Pit River Land & Cattle Co. (Wayne A. Ricciardi)		5/19/94	✓			✓											
Pit River Land & Cattle Co. (Paul W. Ross)		5/25/94	✓			✓											
Various concerned citizens (Letter w/ Petition)		4/94	✓								✓	✓	✓			✓	
Western Helicopters, Inc.		9/15/93	✓										✓				
Independent Commentors																	
I. A. Ailara		5/17/94									✓			✓	✓		
Micahel J. Alberg		5/18/94				✓								✓			✓
Lee Roger Anderson		5/24/94				✓							✓	✓		✓	
Merle Anderson	Susnvle		✓					✓			✓			✓			
Thomas R. Anderson		5/19/94	✓	✓		✓											
Francis Ballard		5/16/94	✓														
Rosemarie Bejcek		5/94	✓													✓	
David E. Bowling	Alturas					✓								✓			

Commentor	Meeting Location	Date of Letter/ Comment	Project Descrip. tion/ Purpose/ Need	Alter- natives	Air	Biology	Cultural	Energy/ Utilities	Geology/ Soil/ Paleon- tology	Hydro- logy	Land	Noise	Public Safety/ Health	Socio- economics/ Public Services	Trans- portation Traffic	Visual	Cumula- tive/ Growth Induce- ment
Frank E. Braze	Susanvle	4/29/94	✓						✓				✓	✓		✓	
Earlie and Mary Brown	Susanvle	5/10/94 5/17/94	✓									✓	✓				
James and Sharon Brown		3/25/95 5/25/94	✓			✓						✓					
Ed Buchaun		5/27/94	✓									✓					
Lorraine Burke	Reno	5/94	✓	✓									✓	✓		✓	✓
Patricia Lee Cantrall	Alturas		✓	✓				✓					✓			✓	✓
John and Donna Cheney		5/10/94	✓													✓	
Nick and Virginia Chorak	Susanvle	4/27/94	✓	✓		✓							✓			✓	
Michael L. Clark		4/27/94									✓		✓			✓	
Paul and Della Cooley		5/10/94		✓													
Chuck and Jean Coye		6/07/94									✓					✓	
Dale and Denise Culbertson	Susanvle	5/03/94	✓		✓	✓		✓	✓	✓	✓		✓	✓			
D.D. (name illegible)		5/13/94		✓									✓	✓		✓	
W. L. Davison		4/29/94	✓										✓			✓	
Joe and Emmie Dees	Susanvle	5/10/94		✓		✓					✓		✓			✓	
Gordon and Marilyn Dick		5/17/94 5/25/94	✓						✓							✓	
W. L. Dolier	Alturas																
Tim E. Ebright (with petition)	Susanvle Reno Loyltn	5/26/94	✓	✓		✓							✓			✓	
Larry Evans		5/16/94	✓	✓									✓				
Jimmie and Dianne Ferguson	Alturas	5/16/94	✓	✓		✓			✓		✓		✓	✓		✓	
Nancy Finley		5/31/94	✓				✓						✓			✓	✓
Lorraine Flournoy	Alturas		✓	✓		✓			✓	✓			✓				
Jody Gabel	Susanvle							✓					✓	✓			
John Gaither	Susanvle		✓	✓		✓					✓						✓
Bob Garrison		5/16/94	✓									✓	✓	✓		✓	
Jack and Marcia Gaskey		4/19/94											✓	✓		✓	
Lynda and Tom Grimme		5/19/94											✓	✓		✓	

Commentor	Meeting Location	Date of Letter/ Comment	Project Descrip. tion/ Purpose/ Need	Alter- natives	Air	Biology	Cultural	Energy/ Utilities	Geology/ Soil/ Paleon- tology	Hydro- logy	Land	Noise	Public Safety/ Health	Socio- economics/ Public Services	Trans- portation Traffic	Visual	Cumula- tive/ Growth Induce- ment
Ken Groesbeck	Susanvle		✓						✓		✓				✓		✓
Paul Herman	Susanvle	5/27/94	✓	✓		✓		✓					✓			✓	
Robert L. Hess		5/11/94	✓	✓							✓			✓			
Richard M. Hill	Reno	5/96	✓									✓	✓				
Charles Hooper	Susanvle Reno		✓			✓			✓				✓	✓			✓
Jack Irby	Susanvle							✓						✓			
Ellen L. Jones		5/18/94	✓	✓										✓		✓	✓
Jennifer Kern		5/27/94	✓								✓		✓			✓	
Richard Kern		5/27/94	✓			✓					✓		✓			✓	
Wauneta Jo Knoch		4/20/94	✓													✓	
Nancy Krauel		4/10/94	✓								✓			✓		✓	✓
Thomas F. Krauel	Susanvle Alturas	5/06/94 to 5/26/94	✓	✓		✓	✓			✓	✓		✓			✓	
Patrick Landon	Susanvle			✓							✓			✓			
Jack Lensing	Susanvle																
John Lenz	Reno																
Paula Lenz	Reno	5/02/94 5/27/94	✓		✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
Robert Leonard		5/01/94	✓											✓			✓
Jan Loverin	Reno Loyltn		✓	✓							✓		✓				
Jim Loverin	Loyltn		✓								✓						
Leonard L. Lower		5/10/94	✓					✓									
Ann B. Marks	Alturas	2/21/94 5/06/94 & 5/09/94	✓	✓							✓		✓				✓
Jo Ann Marsh		5/24/94	✓									✓	✓			✓	
Michael Mc Court	Loyltn	5/25/94	✓	✓		✓					✓			✓		✓	
Rod McElwain	Susanvle													✓			
Paul Nielsen	Alturas		✓														
John Owens	Reno		✓														

Commentor	Meeting Location	Date of Letter/ Comment	Project Descrip. tion/ Purpose/ Need	Alter- natives	Air	Biology	Cultural	Energy/ Utilities	Geology/ Soil/ Paleon- tology	Hydro- logy	Land	Noise	Public Safety/ Health	Socio- economics/ Public Services	Trans- portation Traffic	Visual	Cumula- tive/ Growth Induce- ment
Flavia Susan Poole		5/20/94	✓														
D. Prather		6/96	✓			✓											
Pamela Price		5/25/94	✓														
Carl and Anita Rademann	Reno	5/27/94	✓			✓	✓		✓							✓	
Kelle S. Ray		5/21/94				✓							✓				
Jack Rice		5/11/94	✓	✓													
Andy Sallaberry	Loyltn		✓	✓													
Sierra Pacific Power Company		5/27/94	✓			✓											
Betty Smith	Alturas												✓	✓			
Gary Smyres	Reno		✓	✓								✓				✓	
Gary and Lu Anne Spicer	Alturas	4/21/94	✓								✓						✓
Don Stahl	Alturas		✓			✓	✓							✓			
Jeanne Steinheimer		5/21/94		✓		✓											
Larry Thomason		5/09/94				✓			✓		✓	✓	✓	✓		✓	
Ken Vuletich		5/09/94	✓														
Benny M. Wade		5/11/94		✓							✓			✓		✓	
Sharon K. Wagner	Reno	5/26/94				✓							✓	✓		✓	
Skeeter Wesinger		5/23/94									✓		✓			✓	
Lassen County Land Owner (name illegible)		5/19/94		✓													
Government Agencies																	
California Pines Community Services District		4/29/94				✓							✓				
City of Susanville		4/22/94	✓											✓			✓
Lassen Municipal Utility District		5/23/94	✓														
Lassen County, Dept. of Community Development		4/25/94	✓	✓					✓		✓			✓		✓	✓
Modoc County Board of Supervisors (Ron McIntyre)	Alturas	5/17/94	✓								✓		✓	✓		✓	
Sierra Army Depot (Dept. of the Army)		5/25/94				✓			✓				✓		✓		

Commentor	Meeting Location	Date of Letter/ Comment	Project Descrip. tion/ Purpose/ Need	Alter- natives	Air	Biology	Cultural	Energy/ Utilities	Geology/ Soil/ Paleon- tology	Hydro- logy	Land	Noise	Public Safety/ Health	Socio- economics/ Public Services	Trans- portation Traffic	Visual	Cumula- tive/ Growth Induce- ment
Sierra County		4/28/94 5/03/94	✓								✓		✓	✓	✓		✓
State of Nevada, Commission for the Preservation of Wild Horses		4/21/94				✓											
State of Nevada, Dept. of Conservation and Natural Resources (Division of Water Resources)		5/12/94								✓							
State of Nevada, Dept. of Conservation and Natural Resources (Division of Wildlife)		5/12/94				✓											
State of Nevada Public Service Commission		6/07/94	✓											✓			
State of California, Dept. of Fish and Game		5/03/94 5/27/94		✓		✓				✓	✓		✓				✓
State of California, Dept. of Transportation (CalTrans)		4/28/94 5/12/94											✓	✓			
State of California, Regional Water Quality Control Board - Central Valley Region		4/08/94				✓			✓	✓							
State of California, Regional Water Quality Control Board - Lahontan Region		5/17/94								✓							✓
University of Nevada, Reno (Dept. of Ecology, Evolution and Conservation Biology)		5/02/94		✓			✓			✓						✓	
U.S. Department of Agriculture, Forest Service, Toiyabe National Forest		6/02/94	✓	✓		✓				✓			✓			✓	
U.S. Environmental Protection Agency, Region IX		5/23/94	✓		✓	✓				✓			✓				✓
U.S. Department of Interior, Bureau of Land Management (Linda D. Hansen, Memo)		12/16/93				✓											
U.S. Department of Interior, Bureau of Land Management (Peter Humm)		5/24/94		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓
U.S. Department of Interior, Fish and Wildlife Service		5/05/94	✓	✓	✓	✓				✓		✓					

3. SCOPING ISSUES AND CONCERNS

This section identifies issues of concern, alternatives, and suggested mitigation measures that the EIR/S should address, as identified by parties commenting on the NOP and NOI, by verbal comments at Scoping Meeting, and by other written comments. Issues and concerns are presented in summary by issue area. They are not organized according to level of importance. As reflected by Table 2-1, many scoping comments were received in both oral and written forms. In many cases, commentors repeated their written comments orally at the Scoping Meetings. Therefore, repeated comments are only cited once.

3.1 PROJECT DESCRIPTION

- Maintenance of line route within access of Lassen Municipal Utility District facilities.
- Location of proposed laydown and staging areas
- Location of substations
- Dimensions and installation of phase shifters
- Urgency of need for project
- Potential benefits and practicality of fiber optics installation
- Alleviation of Reno power outages by the project
- Impacts of "wheeling" (capacity trade between power companies)
- Reliability of Surprise Valley Electrification's wooden-poled 235 kv line, to be tapped into by SPPCo
- Frequency of power outages.

3.2 AIR QUALITY

- Ambient conditions
- Population growth impacts on air quality
- Construction and operation impacts
- Air quality planning compliance with the California Clean Air Act
- Conformance with Nevada State Implementation Plan for Air Quality Attainment
- Fugitive dust emissions.

3.3 BIOLOGICAL RESOURCES

- Placement of endangered species protective guards
- Field season for plant and animal data collection

- Revegetation of disturbed sites with native plants
- Protection of reclaimed sites from off-road vehicles and livestock
- Future indirect impacts on biological resources
- Mapping of flora and fauna adjacent to and within project area, particularly special status species
- Construction and operation alteration or impacts to wetlands
- Human access to critical habitat areas
- Migratory bird collisions with transmission line
- Identification of critical fisheries habitat
- CEQA requirements for biological surveys
- Compliance with Endangered Species Act (ESA)
- Impacts on fishery resources
- Impacts on migratory waterfowl and their habitat
- Magnitude of potential waterfowl collision problems
- Impacts of access roads and other ancillary facilities on terrestrial and aquatic wildlife and their habitats
- Loss of habitat due to ground disturbance
- Impacts on non-migratory waterfowl
- Impacts on Modoc National Wildlife Refuge
- Impacts on bird nesting and foraging
- Blasting impacts on animals
- Destruction of bitter brush, desert peach and other source of forage for deer and wild horses
- Impacts on wetlands along Pit River
- Impacts on deer wintering areas
- Impacts on predatory behavior of mountain lions, bobcats and coyotes
- Construction impacts on surrounding foliage
- Spread of noxious weeds

- Impacts of right-of-way clearing
- Impacts associated with changed raptor/prey interactions
- Transmission line and tower design to prevent bird collision
- Placement of marked balls on static wires
- Impacts on historical migration routes of Nevada big game
- Noise impacts on wildlife reproduction.

3.4 CULTURAL RESOURCES

- Impacts on National Register buildings
- Historical/cultural surveys of the southern end of Long Valley
- Impacts on archaeological resources
- Impacts on historical Native American hunting and burial grounds
- Impacts on National Historical Trail Study Area
- Impacts on Infernal Caverns.

3.5 ENERGY AND UTILITIES

- Impacts of interference with communications systems such as radios, CB radios, satellite TVs and telephones, and normal telephone service
- Alleviation of Reno power outages by the project
- Impacts of "wheeling" (capacity trade between power companies).

3.6 GEOLOGY, SOILS, AND PALEONTOLOGY

- Project impact on extraction of minerals, particularly pozzolan in southern Lassen County
- Erosion control at construction sites
- Properties in highly erodible soil category
- Soil disturbance and reseeding
- Impacts from snapping of line due to a 7.0 earthquake
- Blasting impacts
- Impacts of geotechnical trenching and testing

- Soil productivity of croplands and non-croplands
- Soil capability for right-of-way restoration and maintenance
- Impacts on columbia Mammoth site.

3.7 HYDROLOGY

- Acquisition of water rights
- Obstruction or diversion of the natural flow of or change to the bed, channel, or bank of any stream
- Water quality certification and waste discharge requirements
- Water quality standards and measures
- Federal permits for floodplains and wetlands
- Storm water pollution prevention
- Water quality monitoring
- Compliance with Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Materials
- Implementation of the Clean Water Act
- Impacts from increased erosion and sediment loads to streams
- Disturbance to underground streams which flow into wetlands
- Impacts on groundwater table or possibility of groundwater contamination
- Effects on natural springs.

3.8 LAND USE, RECREATION, AND EDUCATIONAL, RELIGIOUS, OR SCIENTIFIC USES

- Impacts on existing land uses in Lassen County
- Consideration of Lassen County Energy Element policies
- Impacts to existing residential and agricultural uses
- Compliance with General Plans of affected jurisdictions
- Compliance with various land use regulations
- Land use conflicts with Hallelujah Junction Wildlife Area

- Conflict between residential uses and the Bordertown substation
- Depreciation of property values
- Use of uninhabited BLM parcels
- Public agency land exchanges
- Recreational uses of Fort Sage area
- Impacts on agricultural development
- Impacts on planned development of business and residential uses
- Lessening of rural development
- Impacts on the recreational use of Alturas Municipal Golf Course.

3.9 NOISE

- Noise impacts on wildlife reproduction
- Impacts on sensitive receptors
- Audible noise from line operation (buzzing sound)

3.10 PUBLIC SAFETY AND HEALTH

- Helicopter safety
- Fire hazards and protective fire measures
- EMF effects on human and animal health
- Spacing of transmission line towers to minimize electrocution
- Hazardous materials storage and related spill response procedures
- Risk of spills during construction
- Aircraft hazard during aerial surveys and crop spraying
- Emergency vehicle access
- Interference with heart pacemakers
- Impacts of lightning and resulting fires
- Impacts of line's close proximity to Tuscarora Gas Pipeline.

3.11 SOCIOECONOMICS AND PUBLIC SERVICES

- Current and projected revenue and service demands
- Benefits to California and the region
- Impacts of EMFs on livelihood of cattle ranchers
- Impacts of development of renewable resources to provide economic activity
- Reduction of home and property values with traversing transmission line
- Benefits from sales and use tax revenues
- Possible cost reduction to Rural Power Company
- Impacts of temporary population growth due to construction crews
- Effects of increased availability and reliability of electric power in the region
- Effects of increased fiber optic capability in the region
- Impacts on employment.

3.12 TRANSPORTATION AND TRAFFIC

- Impacts on munitions transport
- Construction crew access through restricted Sierra Army Depot areas
- Impacts to highway system
- CalTrans encroachment permit
- Restriction of highway access
- Relationship between off-road vehicles and access roads.

3.13 VISUAL RESOURCES

- Impacts within scenic highway corridors
- Aesthetic enhancements
- Lighting and landscape plans
- Impacts on scenic areas
- Use of visual simulations

- Impacts on existing natural landscape character and scenic conditions
- Impacts on BLM Viewshed
- Impacts on skyline
- Possibility of imposing a "view tax"
- Impacts on Red Rock scenic area
- Berming of structures with large trees
- No structures on hill crests
- Stone walls to hide structures
- Impact minimizing paints.

3.14 CUMULATIVE AND GROWTH-INDUCING IMPACTS

- Impacts of project-specific temporary housing to serve project construction
- Impacts from creation of a new utility corridor
- Impacts of line's close proximity to Tuscarora Gas Pipeline
- Future indirect impacts on biological resources
- Impacts of multiple transmission lines through private property
- Impacts on entire line's service area
- Attraction of industry due to substation locations
- Population growth impacts on air quality.

3.15 SUGGESTED ALTERNATIVES

- Route east of U.S. Hwy 395 in the Hallelujah Junction area
- Reclamation proposals
- Placement of project in the State of Nevada
- Use of existing utility corridors
- Underground burial of line
- Segments W and Z

- Hoge Road alternative - placement of line next to existing radio towers
- Impacts of North Warner Street Intertie route
- No action, or not constructing line
- Los Angeles Department of Water and Power route
- Impacts of route variation to avoid sensitive areas, and the level of inventory on these variations
- North Valley substation through Winnemucca Valley
- Geothermal electric power supply
- Use of route on east side of Long Valley.

EXHIBITS

A. Notice of Preparation
B. Notice of Intent
C. Scoping Meeting Handout
D. CPUC Decision-Making Process sheet
E. BLM/FS Decision-Making Process Sheet
F. Project Study Area Map
G. Mailing List Registration Form
H. Speaker Registration Card
I. EIR Environmental Issues Questionnaire
J. Notice of Public Scoping Meetings

SCOPING COMMENT LETTERS (separately bound, available upon request)

VERBAL COMMENTS (transcripts available upon request)

CALIFORNIA PUBLIC UTILITIES COMMISSION
AND THE
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ALTURAS 345 kV TRANSMISSION LINE

NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT/STATEMENT FOR THE PROPOSED ALTURAS TRANSMISSION LINE PROJECT

(March 17, 1994)

TO All Interested Parties

SUBJECT

The California Public Utilities Commission (CPUC) and the US Department of the Interior, Bureau of Land Management (BLM) will direct the preparation of a joint environmental impact report/statement (EIR/EIS) for the Alturas Transmission Line Project proposed by Sierra Pacific Power Company (Sierra) and alternatives. A third-party contractor, under the direction and supervision of the CPUC and BLM, will prepare an EIR/EIS to comply with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

The CPUC, as the lead California State agency, and the BLM, as the lead Federal agency, will direct the preparation of the Draft and Final EIR/EIS in cooperation with the US Department of Agriculture, US Forest Service (FS).

SUMMARY OF THE PROPOSED PROJECT

The EIR/EIS will assess the environmental impacts of the construction, operation, and maintenance of a 345,000 volt (345kV) electric power transmission line extending approximately 160 miles from the vicinity of Alturas, California, through Modoc, Lassen and Sierra Counties, California, and through Washoe County, Nevada, to the vicinity of Reno, Nevada. The general location of Alturas Transmission Line Project is shown on Appendix 1. The project would affect Federal, State and private lands. Possible alternatives to the project would include: (1) alternatives presented in Sierra's application; (2) no action or project denial(s); (3) approval of one or more of the proposed alternative projects; (4) any reasonable project and route alternative identified as a result of project scoping; and (5) combinations of any of the above.

The project has been proposed to increase the reliable capacity of Sierra's system, supply emergency protection for the Reno/Lake Tahoe customer loads, connect Sierra to a new market for the purchase of low cost electricity and create capacity that

could be used by other electric utilities and independent power producers. The total project cost is estimated to be $120,000,000.

An initial study was not prepared for the project due to the extensive information contained in the Proponent's Environmental Assessment (PEA) provided by Sierra in its Application for a Certificate of Public Convenience and Necessity. Copies of Sierra's application and PEA are available for review at the following locations:

Bureau of Land Management
Susanville District Office
705 Hall Street
Susanville, CA 96130
Contact: Pete Humm
(916) 257-5381

Sierra Pacific Power Company
6100 Neil Road
Reno, NV 89520
Contact: Steven Siegel
(702) 689-4429

California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102
Contact: Julie Halligan
(415) 703-2776

U.S. Forest Service
Modoc National Forest
441 N. Main Street
Alturas, CA 96101
Contact: Randy Sharp
(916) 233-5811

If necessary, responsible State and Federal agencies may request a copy of Sierra's application and/or PEA by contacting Steven Siegel at the address listed above.

The EIR/EIS will discuss environmental impacts that could occur as a result of the construction, operation, and maintenance of the proposed project. The PEA identifies the following significant and potentially significant environmental impacts:

* Wildlife: Bird and bat deaths from collision with tower and/or conductors; raptor and raven predation due to hunting and other uses (perching, nesting) of the powerline; loss of habitat due to removal of vegetation; loss of habitat due to intrusion; migration alteration due to the project's presence; and increased disturbance due to access.

* Vegetation: Loss of habitat and individual plant, potential increase in invader or exotic plant species.

* Soils: Compaction, soil loss due to increases in erosion.

* Recreation: Loss of recreational areas due to project siting.

* Cultural Resources: Impacts due to sites and isolated artifacts undiscovered during cultural resource investigations, increase in vandalism due to improved access, potential visual intrusions to sites due to presence of the project.

* Visual Impacts: Decrease in visual quality due to presence of the project (contrast, texture, line and form changes), skylining, glare.

* Fire: Potential increase in fire risk due to operation and maintenance activities.

* Socioeconomics: Potential residential/commercial displacement due to conflicts with project siting, reduction of grazing and agricultural areas due to project siting, potential loss of use of mining areas due to project siting.

* Health and Safety: Increased concern regarding electric and magnetic field (EMF) effects, increased risk of induced current shocks, direct current shocks, and effects to cardiac pacemakers.

* Growth-Inducing Impacts/Cumulative Effects: The designation of a new utility corridor may attract additional linear projects such as roadways, communication facilities or pipelines. Secondary powerline taps and substation additions to the project are also possible.

THE EIR/EIS PROCESS

CEQA requires the CPUC to take into account the environmental impacts that could result from a proposed project whenever it considers an application for a Certificate of Public Convenience and Necessity. The BLM, as the lead Federal agency, is required to consider the same potential impacts on Federal land under NEPA. The EIR/EIS will provide both the CPUC and the BLM the information required to make a decision on the project. CEQA and NEPA also require that the EIR/EIS development process includes public notice of the proposed project and address concerns the public may have about the proposed project.

Our third-party contractor's independent analysis of the project will result in the publication of a Draft and Final EIR/EIR. A comment period of a minimum of 45 days will be allocated for the review of the Draft EIR/EIS. We will consider all comments on the Draft EIR/EIS and revise the document, as necessary, before issuing a Final EIR/EIS. The Final EIR/EIS will include our response to each comment received.

PROJECT SCOPING

Public and agency scoping sessions will be held in Alturas, CA, Susanville, CA and Reno, NV at locations and dates to be announced.

AGENCY COMMENTS

This Notice of Preparation has been sent to State responsible agencies, trustee agencies, responsible Federal Agencies and the State Clearinghouse. A list of agencies receiving this notice is attached as Appendix 2. We need to know the views of your agency

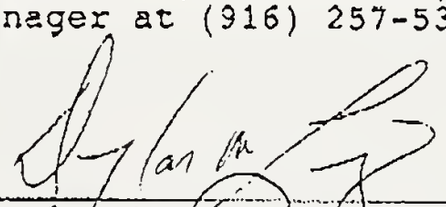
as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Responses should identify the issues to be considered in the Draft EIR, including siginificant environmental issues, alternatives, mitigation measures, and whether the responding agency will be a responsible or trustee agency.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice. Please send your response to:

Julie Halligan, Project Manager
Commission Advisory and Compliance Division
Environmental and Energy Advisory Branch
505 Van Ness Avenue
San Francisco, CA 94102
(415) 703-2776 Fax: (415) 703-1965

FOR FURTHER INFORMATION ON THE FEDERAL ACTION

This Notice of Preparation of an EIR/EIS is issued by the CPUC. For further information on the Federal action, write to the District Manager, Bureau of Land Management, 705 Hall Street, Susanville, California, 96130, or contact Peter Humm, BLM Project Manager at (916) 257-5381.



Douglas M. Long, Manager
Environmental and Energy Advisory Branch
Commission Advisory and Compliance Division

Exhibit B
IN REPLY REFER TO:
2800
CACA-31406
(CA-020)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
SUSANVILLE DISTRICT OFFICE
705 Hall Street
Susanville, California 96130

March 30, 1994

Dear Interested Party:

The Bureau of Land Management (BLM) and the California Public Utilities Commission (CPUC) are cooperating in the preparation of a joint Environmental Impact Statement (EIS) and Environmental Impact Report (EIR) to analyze the environmental impacts of a proposed 345 kilovolt power transmission line in northeastern California and northwestern Nevada. The power transmission line project has been proposed by the Sierra Pacific Power Company (SPPCo) of Reno, Nevada. The proposed line would run from Alturas, California to Reno, Nevada. Enclosed is a copy of the BLM's "Notice of Intent" to prepare an Environmental Impact Statement, and a map showing the route alternatives proposed by SPPCo.

The Notice of Intent asks for your comments on the proposal, and provides more information on the project. The BLM and CPUC will also be sending out a detailed description of the proposed power line project. Public scoping meetings will be held at the following locations and dates:

1) **Susanville, California:** May 17, 1994 (Tuesday); CPUC Pre-hearing Conference, 3 p.m. to 5 p.m.; Public Scoping Meeting, 6 p.m. to 9 p.m., both at the Monticola Club, 140 So. Lassen St., Susanville.

2) **Alturas, California:** May 18, 1994 (Wednesday); Public Scoping Meeting, 6 p.m. to 9 p.m., at the Elks Lodge, 619 N. Main St., Alturas.

3) **Reno/Sparks, Nevada:** May 19, 1994 (Thursday); Federal and State Agency Scoping Session, 3 p.m. to 5 p.m.; Public Scoping Meeting 6 p.m. to 9 p.m., both at the Best Western McCarran Inn, 55 E. Nugget, Sparks.

We are sending you this Notice of Intent to ask you to participate in the public scoping process and to identify any issues that you would like to see addressed in the EIS/EIR. Because this will be a joint BLM/CPUC environmental document, please send your written comments to: California Public Utilities Commission; Attn: Julie Halligan, Project Manager; Commission Advisory and Compliance Division, Environmental and Energy Advisory Branch; 505 Van Ness Ave., Room 3207; San Francisco, CA 94102.

Written comments should reference BLM case number CACA-31406, and the "Alturas Intertie Project". If you have any questions on this Notice of Intent, please call Peter Humm, BLM Project Manager, Eagle Lake Resource Area, at (916) 257-5381 or 257-0456.

Sincerely,

Herrick E. Hanks
District Manager

Enclosures:
Notice of Intent
Project Map

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

AGENCY: Bureau of Land Management, Interior
Susanville District Office, California
[CA-020-5101-10-B039; CACA-31406, NVN-57250]

ACTION: Notice of Intent to Prepare an Environmental Impact Statement (EIS).

SUMMARY: This Notice of Intent to Prepare an Environmental Impact Statement is published in accordance with the regulations under Title 40, Code of Federal Regulations, Part 1501.7. The Bureau of Land Management (BLM), Susanville District will, together with the California Public Utilities Commission (CPUC) direct the preparation of a joint Environmental Impact Statement and Environmental Impact Report (EIS/EIR) for a proposed 345 kilovolt electric power transmission line. The joint EIS/EIR is to be prepared by a third party contractor. The BLM will be the lead Federal agency, and with the CPUC as the lead California State agency will produce this joint EIS/EIR to satisfy the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), respectively. The following Federal agencies have indicated that they will participate as cooperating agencies in the preparation of the EIS/EIR: U.S. Forest Service (Modoc and Toiyabe National Forests); Department of Defense (Sierra Army Depot); U.S. Fish and Wildlife Service; Bureau of Indian Affairs (Sacramento Area Office); Bonneville Power Administration.

The EIS/EIR will assess the environmental impacts of the approval, construction, operation and maintenance of a 345,000 volt (345KV) electric power transmission line approximately 160 miles long, running from the vicinity of Alturas, California through Modoc, Lassen, and Sierra Counties, California, through Washoe County, Nevada to the vicinity of Reno, Nevada. The project has been proposed by the Sierra Pacific Power Company of Reno, Nevada, and is referred to as the Alturas Intertie. The project would affect Federal, State and private lands. Possible alternatives to the project include: (1) project and route alternatives presented in the proponent's application; (2) no action or project denial(s) alternative; (3) approval of one or more of the proposed alternative projects; (4) any reasonable project and route alternatives identified as a result of the scoping; and (5) combinations of any of the above.

The National Environmental Policy Act requires the BLM to take into account the environmental impacts that could result from a major Federal action. The CPUC is required to consider the same potential impacts of a proposed action within the State of California under the California Environmental Quality Act. The EIS/EIR we are preparing will give the BLM and the CPUC the information needed to make a decision based on understanding of environmental consequences and take actions that protect, restore and enhance the environment. NEPA (and CEQA) also requires us to discover and address concerns the public and other governmental agencies may have about a proposed project. This process is called "scoping". The main goal of the scoping process is to focus the analysis in the EIS/EIR on

the important environmental issues, and to separate those issues that are not significant and do not require detailed study. The EIS/EIR will also evaluate possible alternatives to the project, or portions of the project, and make recommendations on how to avoid or lessen environmental impacts of the project.

The purpose of this notice is to invite members of the public, affected Federal, State, and local agencies, any affected Indian tribes, the proponent of the action, and other interested persons to participate in the scoping process for this project by providing written and verbal comments or recommendations concerning the issues to be analyzed in the EIS/EIR.

DATES: Written comments will be accepted until May 6, 1994. Public and governmental agency scoping sessions will be held in Reno, NV, Susanville, CA and Alturas, CA at locations and dates that will be announced soon.

ADDRESSES: Because this is a combined Federal EIS and State EIR, the Bureau of Land Management and the California Public Utilities Commission have agreed that all written comments will be collected at one location. Written comments on the combined Federal EIS and State EIR must therefore be sent to the California Public Utilities Commission (Attn: Julie Halligan, Project Manager); Commission Advisory and Compliance Division, Environmental and Energy Advisory Branch; 505 Van Ness Ave., Room 3207; San Francisco, CA 94102. Written comments should reference BLM case number CACA-31406, and the "Alturas Intertie Project".

FOR FURTHER INFORMATION CONTACT: This Federal Notice of Intent to prepare an EIS is issued by the District Manager, Bureau of Land Management, 705 Hall Street, Susanville, California 96130. Any Federal agencies or Indian tribes wishing to participate as a Federal Cooperating Agency should send a letter prior to May 1, 1994 to the BLM Susanville District Manager at this address, describing only the extent to which they want to be involved. (Scoping comments must be sent separately to the CPUC address given above.) The letter must reference case number CACA-31406. For further information on the Federal action, write to the District Manager or call Peter Humm, BLM Project Manager, at (916) 257-5381 or 257-0456.

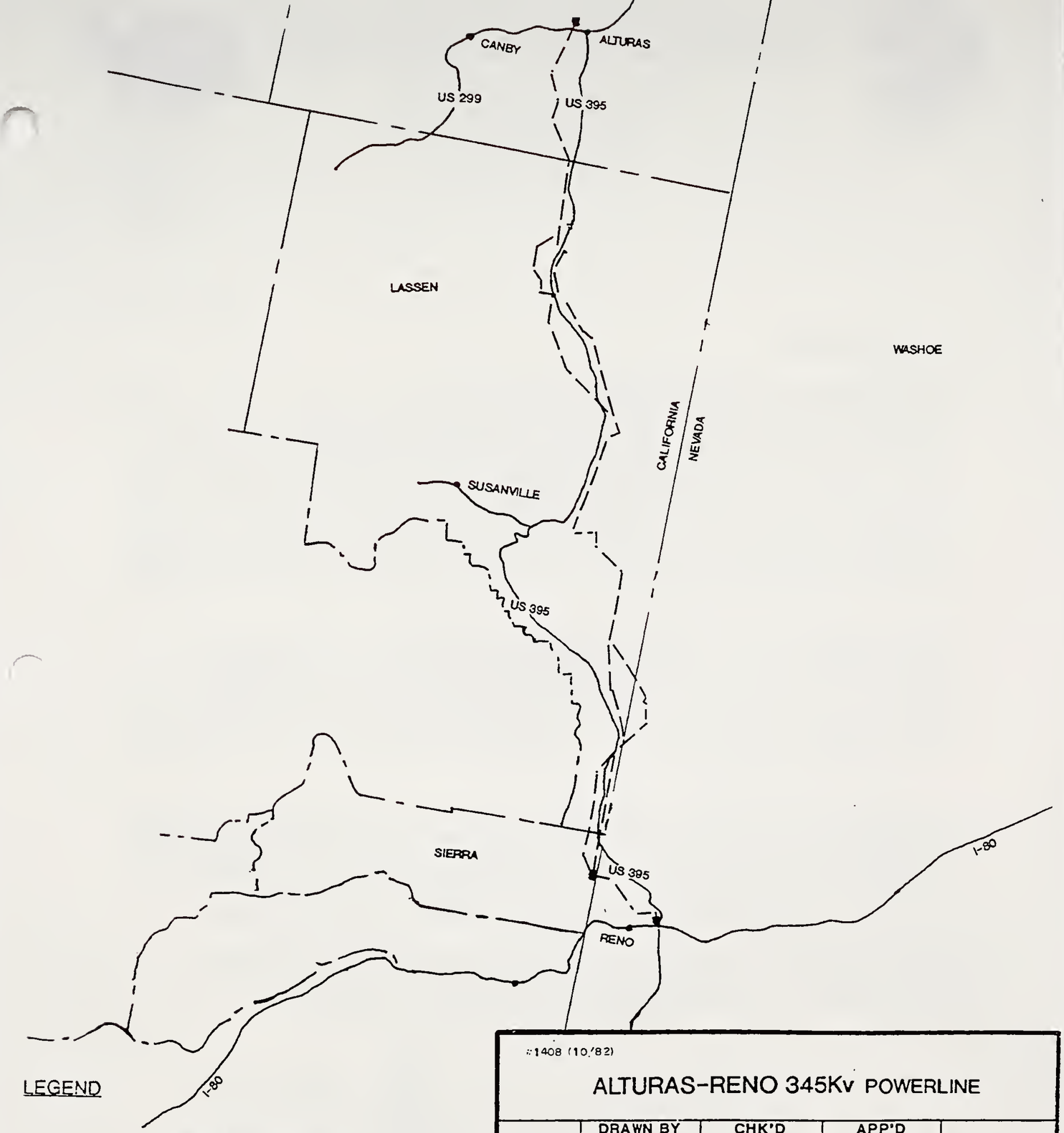
SUPPLEMENTAL INFORMATION: The Bureau of Land Management Susanville District Manager will be responsible for issuing the Record of Decision for public (BLM) land, and the Forest Supervisors for the Modoc National Forest and the Toiyabe National Forest will be responsible for issuing Records of Decision for National Forest System lands.

Sierra Pacific Power Company (SPPCo) of Reno, Nevada, has submitted right-of-way applications to the Bureau of Land Management and the United States Forest Service for the purpose of constructing, operating and maintaining a 345KV electric power transmission line from Alturas to Reno. Permits would also be needed from the California Public Utilities Commission and the Public Service Commission of Nevada. SPPCo proposes to build this line to provide increased reliability and electric power capability to the Reno/Lake Tahoe area. The line would tap into a Bonneville Power Administration electric transmission line north of Alturas, CA, and run approximately 160 miles south to tie into the existing SPPCo electric power grid near Reno, NV. The proposed route generally parallels U.S. Highway 395 from Alturas to the vicinity of Wendel, CA, then runs east of Honey Lake and Herlong, CA, then south in the vicinity of Highway 395 again to

the Reno area. This proposed route parallels the proposed Tuscarora gas pipeline route for much of the distance between Alturas and Herlong. The proposal includes the construction of two new electrical substations, one northwest of Alturas and one near Bordertown, Nevada. The existing SPPCo North Valley Road substation, near McCarran Blvd. in Reno, would be improved to allow a tie-in by the new 345KV line. SPPCo proposes to build the powerline using tubular steel H-Frame structures, made of a steel which will weather to a dark brown color. The structures would support six non-reflective ("non-specular") stranded aluminum/steel conducting wires (one inch in diameter), arranged in three pairs of two wires, plus two steel "shield" wires which protect the line from lightning strikes. The shield wires would be 3/8" diameter stranded steel wires with fiber optic cables inside the wires for SPPCo transmission operational communications. The proposed line route would follow existing dirt and paved roads to the extent possible. New road construction would be limited as much as possible, and there are likely to be areas where the structures would be installed using helicopters.

Hedrick E. Hanks
District Manager

Date: 3/15/94



LEGEND

- POWERLINE ROUTES
- COUNTY LINES
- HIGHWAYS
- SUBSTATION SITES
- STATE LINE

SCALE _____

#1408 (10/82)

ALTURAS-RENO 345Kv POWERLINE

	DRAWN BY	CHK'D	APP'D	
	CZ			
DATE	3-15-94			
INITIAL				

Sierra Pacific Power Company

W. O. NO. _____

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Eagle Lake Resource Area
705 Hall Street
Susanville, California 96130-3730

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
2800
CACA-31406
(CA-020)

April 30, 1994

Dear Interested Party:

On March 30, 1994, the Bureau of Land Management (BLM) mailed copies of a Notice of Intent to Prepare an Environmental Impact Statement (EIS) to analyze the environmental impacts of a proposed 345 kilovolt power transmission line in northeastern California and northwestern Nevada. The power transmission line project has been proposed by the Sierra Pacific Power Company (SPPCo) of Reno, Nevada. The BLM and the California Public Utilities Commission (CPUC) are cooperating in the preparation of a joint Environmental Impact Statement (EIS) and Environmental Impact Report (EIR) on this power transmission project. That Notice of Intent asked for your comments on the proposal, and provided more information on the project. The cover letter for the Notice described the times and locations for scheduled public scoping/comment sessions to assist BLM and CPUC in identifying issues to be analyzed in the EIR/EIS.

There has been a minor change in the meeting location and schedule. The May 18, 1994 meeting in Alturas, California will now be held in the multi-purpose room of the Modoc Middle School, 906 W. 4th Street, Alturas. The CPUC will not hold a pre-hearing conference on this project, so the Susanville public scoping session will start at 6 p.m. in the Monticola Club. The meetings are still scheduled for May 17, 18 and 19, 1994, and all three public meetings will start at 6 p.m. The enclosed Amendment to the Notice of Intent provides the final locations, dates, and times of the three public scoping sessions.

We are sending you this Amendment to the Notice of Intent to ask you to participate in the public scoping process and to identify any issues that you would like to see addressed in the EIS/EIR. Because this will be a joint BLM/CPUC environmental document, please send your written comments to: California Public Utilities Commission; Attn: Julie Halligan, Project Manager; Commission Advisory and Compliance Division, Environmental and Energy Advisory Branch; 505 Van Ness Ave., Room 3207; San Francisco, CA 94102. You may also provide written comments at the public meetings.

Written comments should reference BLM case number CACA-31406, and the "Alturas Intertie Project". If you have any questions on this Amendment to the Notice of Intent, please call Peter Humm, BLM Project Manager, Eagle Lake Resource Area, at (916) 257-5381 or 257-0456.

Sincerely,

Peter Humm

Peter Humm
Project Manager

Enclosure:
Amended NOI

4-00160

4310-40

DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

AGENCY: Bureau of Land Management, Interior

Susanville District Office, California

[CA-020-5101-10-B039; CACA-31406, NVN-57250]

ACTION: Amendment of Notice of Intent to Prepare an Environmental Impact Statement (EIS).

SUMMARY: This Notice Amends a Notice of Intent to Prepare an Environmental Impact Statement which was published in the Federal Register on March 24, 1994 (59 FR 13995-6). The original Notice of Intent requested scoping comments on the preparation of a joint Environmental Impact Statement and Environmental Impact Report (EIS/EIR) for the proposed construction of a 345 kilovolt electric power transmission line by the Sierra Pacific Power Company. The Bureau of Land Management (BLM) and the California Public Utilities Commission (CPUC) are preparing the combined EIS/EIR through a third party contractor. This Amendment to the Notice is published to announce the dates and locations of the public scoping sessions for the preparation of the EIR/EIS. Members of the public, affected Federal, State, and local agencies, any affected Indian tribes, the proponent of the action, and other interested persons are invited to participate in the scoping process for this project by attending the scoping sessions and providing written and verbal comments or recommendations concerning the issues to be analyzed in the EIS/EIR.

DATES: Public and governmental agency scoping sessions will be held as follows: (1) May 17, 1994 (Tuesday), in Susanville, CA, beginning at 6 p.m., at the Monticola Club, 140 S. Lassen St., Susanville. (2) May 18, 1994 (Wednesday), in Alturas, CA, beginning at 6 p.m., at the Modoc Middle School multi-purpose room, 906 W. 4th St., Alturas. (3) May 19, 1994 (Thursday), in Sparks, NV at the Best Western McCarran Inn, 55 E. Nugget, in Sparks. A scoping session for agency concerns of Federal and State agencies will be held from 3 p.m. to 5 p.m., and the scoping session for the public will start at 6 p.m.

ADDRESSES: Written comments on the combined Federal EIS and State EIR must be sent to the California Public Utilities Commission (Attn: Julie Halligan, Project Manager); Commission Advisory and Compliance Division, Environmental and Energy Advisory Branch; 505 Van Ness Ave., Room 3207; San Francisco, CA 94102. Written comments should reference BLM case number CACA-31406, and the "Alturas Intertie Project". Written and verbal comments will also be accepted at the scoping meetings.

FOR FURTHER INFORMATION CONTACT: This Amendment to the Notice of Intent to prepare an EIS is issued by the Associate District Manager, Bureau of Land Management, 705 Hall Street, Susanville, California 96130. For further information on the Federal action, call Peter Humm, BLM Project Manager, at (916) 257-0456.

Robert J. Sherve

Robert J. Sherve

Associate District Manager

Date: 4-25-94

THE PROPOSED ALTURAS TRANSMISSION LINE PROJECT EIR/S
PUBLIC SCOPING MEETING HANDOUT

Exhibit C

INTRODUCTION

Sierra Pacific Power Company (SPPCo) has proposed the construction and operation of a 345,000 volt (345 kV) overhead electric power transmission line from Alturas, California to Reno, Nevada. In their consideration of SPPCo's applications for the proposed project, the California Public Utilities Commission (CPUC) and the U.S. Bureau of Land Management (BLM) are preparing an Environmental Impact Report (EIR) under the California Environmental Quality Act (CEQA), and an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA). The joint CEQA/NEPA document will be referred to as the EIR/S and will assess the potential environmental impacts of the proposed project and alternatives. The CPUC has contracted with an independent consulting firm, Aspen Environmental Group (Aspen), to prepare the EIR/S under the direction of CPUC and BLM.

MEETING AGENDA

1.	Welcome & Introductions	CPUC/BLM
2.	Environmental Review Process & Purpose of Scoping	CPUC/BLM Aspen
3.	Description of Proposed Project and Potential Environmental Review	Aspen
4.	Public Comments & Questions	Moderated by CPUC/BLM
5.	Future Opportunities for Public Involvement	Aspen
6.	Closing Comments	CPUC/BLM

PURPOSE OF SCOPING

The EIR/S on the proposed Alturas Transmission Line Project will focus on significant environmental effects. The process of determining the focus and content of the EIR/S is known as scoping. Scoping helps to identify the range of actions, alternatives, environmental effects, and mitigation measures to be analyzed in depth, and eliminates from detailed study those issues that are not pertinent to the final decision on the proposed project. Scoping is also an effective way to bring together and address the concerns of the public, affected agencies, and other interested parties. Significant issues may be identified through public and agency comments.

Scoping, however, is not conducted to resolve differences concerning the merits of the project or to anticipate the ultimate decision on the proposal. Rather, the purpose of scoping is to help ensure that a comprehensive and focused EIR/S will be prepared that provides a firm basis for the decisionmaking process.

Comments on the environmental issues that you feel should be addressed in the EIR/S may be given verbally at any of the scheduled scoping meetings listed in this handout by using the pink ***Speaker Registration Card*** insert. For your convenience, a separate ***EIR/S Environmental Issues Questionnaire*** is provided for submission of written comments. Written comments must be submitted at the scoping meetings or mailed. The deadline for written comments is May 27, 1994. All correspondence should be addressed to:

Julie Halligan (CPUC)/Peter Humm(BLM)
c/o Aspen Environmental Group
30423 Canwood Street, Suite 218
Agoura Hills, CA 91301

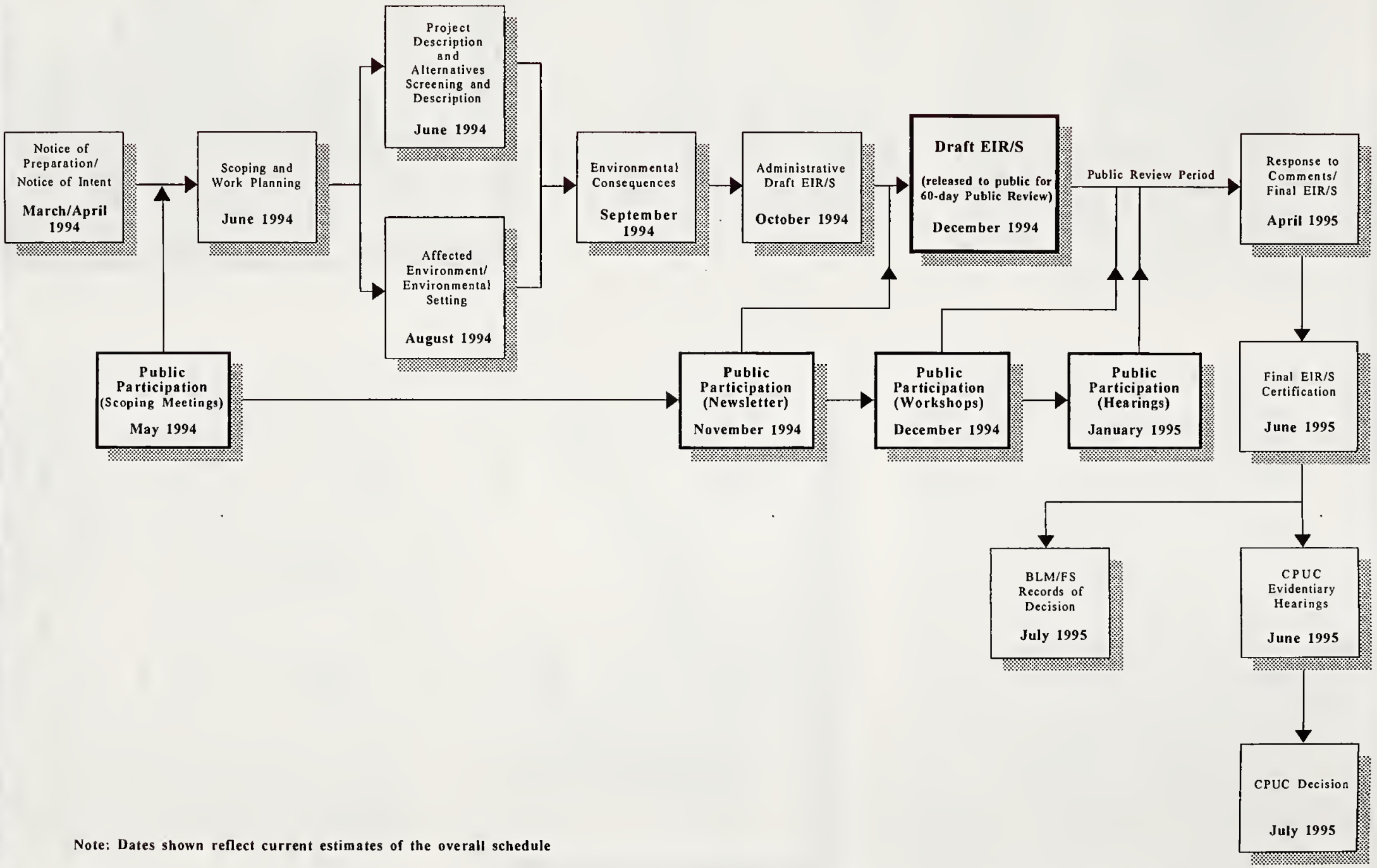
PUBLIC SCOPING MEETINGS

- Susanville — May 17, 1994 6 p.m.
  Monticola Club
  140 S. Lassen St.
- Alturas — May 18, 1994 6 p.m.
  Modoc Middle School
  906 W. 4th Street
- Reno/Sparks — May 19, 1994 6 p.m.
  Best Western McCarran Inn
  55 E. Nugget, Sparks
- Loyalton — May 25, 1994 6 p.m.
  The Social Hall
  County Road A-24

HANDOUT CONTENTS

EIR/S Task Flow	2
Potential Environmental Issues	3
Project Description	3
Future Opportunities for Public Involvement	4
Lead Agencies' Parallel Decisionmaking Process	4
Project Study Area Map	Insert
CPUC's Decisionmaking Process	Insert
BLM's Decisionmaking Process	Insert
Mailing List Registration Form (Blue Card)	Insert
Speaker Registration Card (Pink Card)	Insert
Environmental Issues Questionnaire (White Sheet)	Insert

EIR/S TASK FLOW



Note: Dates shown reflect current estimates of the overall schedule

LIST OF POTENTIAL ENVIRONMENTAL ISSUES OF CONCERN

The EIR/S will present the analysis of the environmental impacts of the proposed Alturas Transmission Line Project and comparative environmental effects of the alternatives, and will identify mitigation measures for potentially significant impacts.

Potentially significant issues identified to date include impacts from the proposed project on or to the following:

- **Air Quality** (construction and operation emissions and effects)
- **Biological Resources** (wildlife and vegetation, special status species, sensitive habitats)
- **Cultural Resources** (archaeological and historic resources, Native American concerns)
- **Earth Resources** (erosion, geologic hazards, soil stability, hydrology and water quality)
- **Educational, Religious, or Scientific Uses**
- **Energy and Utilities**
- **Land Use and Recreation** (residences, schools, public and private lands)
- **Noise** (construction, operation, and maintenance noise effects on humans and wildlife)
- **Public Health and Safety** (fire hazards, EMF sources, emergency communication, airplane/helicopter safety)
- **Socioeconomics and Public Services** (employment, population increase, fire and police protection)
- **Transportation and Traffic**
- **Visual Resources** (residential, key scenic, recreation areas, and travel routes)
- **Cumulative and Growth-Inducing Impacts**

PROJECT DESCRIPTION

Location. The proposed transmission line route is approximately 165 miles long. The proposed route originates just northwest of Alturas at a tap point on the existing Bonneville Power Administration 230 kV transmission line. The route would connect with the proposed Hilltop Substation (Devil's Garden site), cross Highway 299 west of Alturas, and run along a long plateau well to the west of U.S. 395 until the route would approach near to U.S. 395 approximately 5 miles south of Likely.

The route would cross the east side of U.S. 395, paralleling the route of the proposed Tuscarora Gas Pipeline through the Madeline plains. The route would cross over well to the west side of U.S. 395 in the vicinity of Ravendale, crossing back over to the east side near Saddle Rock. The route would closely parallel U.S. 395 to the vicinity of Smoke Creek Ranch Road where it would leave U.S. 395 heading south/southeast to the east side of Wendel then south along the eastern boundary of Sierra Army Depot.

The proposed transmission line route would then go around the east side of the Fort Sage Mountains, then again paralleling U.S. 395 along the western foothills of the Peterson Mountain Range (east of U.S. 395). The route would cross the U.S. 395 and connect to the proposed Bordertown Substation site located just within Sierra County, CA southwest of U.S. 395 near Bordertown, NV. The proposed route would then follow an existing dirt road system along the northern and eastern flanks of Peavine Mountain where it would turn east, paralleling two existing overhead power lines to the proposed transmission line's connection with SPPCo's existing North Valley Road Substation in north-central Reno.

Facilities. At this time, SPPCo proposes to use tubular steel two-pole "H-Frame" structures to suspend the line. These structures would vary in height from 90 to 130 feet due to the variations in terrain which the line would cross. The average span between structures would be approximately 1200 feet.

Interconnection of the new transmission line to the Bonneville and Sierra systems would require design and construction of two new electrical substations, and additions to an existing substation at a third location. Substation sites include the Hilltop Substation located near Alturas, and the Bordertown Substation, located in California, approximately 15 miles northwest of Reno. The south end of the new line would terminate at Sierra's existing North Valley Road Substation, located on the north side of Reno.

Communications requirements for transmission line protection, system control and data acquisition (SCADA), would be provided by a proposed fiber optics system to be strung within the shield or static wire along the entire transmission line. Communications during construction would be by two way radio and cellular phone service.

Construction. There are ten separate phases involved in the construction of transmission lines: 1) Right-of-way preparation, 2) excavation, 3) material distribution, 4) foundation installation, 5) structure assembly, 6) structure erection, 7) stringing of the conductor and shield wire, 8) sagging the conductor and clipping the wire, 9) cleanup of the right-of-way, and 10) right-of-way restoration.

Substation construction consists of the following phases: 1) Site work, grading and fencing substation perimeter, 2) construct reinforced concrete footings and slabs to support structures, 3) conduit installation for electrical control cables, 4) construction for grounding electrical current inside fence, 5) installation of substation gravel, 6) erection of control building on concrete slab, 7) erection of transmission line structures, and 8) equipment installation and testing.

Project Alternatives. In addition to the proposed project the EIR/S will evaluate a number of possible alternatives to the proposed project. Alternatives to be considered include: 1) project and route alternatives presented in the proponent's application; 2) the no action or project denial alternative; 3) any reasonable project and route alternatives identified as a result of the scoping process; and 4) combinations of any of the above.

FUTURE OPPORTUNITIES FOR PUBLIC INVOLVEMENT

Other opportunities for involvement in the project decisionmaking process include:

Informational Workshops. Immediately after the release of the Draft EIR/S, Informational Workshops may be held (if the scoping process results in a demonstrated need for workshops). These informal workshops would be held at the same locations as the Public Hearings, would serve to help interested parties understand the EIR/S document, and would further explain how to participate in the lead agencies' decisionmaking processes. The Informational Workshops would be conducted in December of 1994.

Public Hearings. Public Hearings will be held in Alturas, Susanville, Loyalton and Reno. These meetings will provide a forum for public comment on the Draft EIR/S. Based on the anticipated schedule for preparation of the EIR/S, the Public Hearings would be held in January of 1995, at about the midway point of a 60-day review period for the Draft EIR/S. Written comments on the Draft EIR/S will be accepted throughout the public review period.

LEAD AGENCIES' PARALLEL ENVIRONMENTAL REVIEW

CPUC (EIR under CEQA)	BLM (EIS under NEPA)
Notice of Preparation	Notice of Intent
Scoping	Scoping
Draft EIR	Draft EIS/EPA Filing Federal Register Notice
Public/Agency Review	Public/Agency Review
Final EIR	Final EIS/EPA Filing Federal Register Notice
Review of Responses to Comments by Commenting Agencies	
EIR Certification	BLM/FS Decision

Exhibit D

The CPUC's Decision-Making Process

Overview

The California Public Utilities Commission (CPUC) regulates the services and rates of privately-owned, intrastate utilities and transportation companies which offer services to the public, including pipeline operators. Much of its regulation is carried out through judicial- and legislative-style processes under the direction of an assigned CPUC Administrative Law Judge (ALJ) and, ultimately, the Commissioners. Like a court, the ALJ and Commissioners may take testimony, issue decisions and orders, cite for contempt and subpoena witnesses or records. The Commission's decisions and orders may be appealed only to the California Supreme Court.

Sierra Pacific Power Company's request for CPUC authority will move through the standard CPUC decision process defined in the CPUC Rules of Practice and Procedure, the Public Utilities Code and CPUC General Orders. In addition, the preparation of an Environmental Impact Report (EIR) in accordance with the California Environmental Quality Act (CEQA) will run in parallel. The following table is intended to convey the general sequence of events in each of these parallel processes.

Overall CPUC Process

CPUC reviews Application and Proponent's Environmental Assessment (PEA) for completeness pursuant to CPUC Rule 17.1, Decision 89905 (Information and Criteria List), and any applicable General Order(s). If/Once accepted, the CPUC's formal decision-making process and the CEQA process are triggered.

ALJ, as necessary, may conduct a "PRE-HEARING CONFERENCE (PHC)" to initiate the CPUC's decision process, which would encompass financing authority and rates and conditions of service, as well as an EIR.

Applicant and Interested Parties prepare and file testimony for evidentiary hearings, if scheduled by the ALJ at Prehearing Conference.

As necessary, ALJ holds Evidentiary and/or Public Participation Hearings and receives closing briefs.

ALJ's Proposed Decision issued for comment by Parties (due within 20 days).

Commission's Decision, including adoption of FEIR, issued. (Not earlier than 30 days after Proposed Decision.)

EIR Preparation Track

CPUC mails Notice of Preparation of EIR and Public Meetings to affected agencies and publishes Notice in newspapers.

CPUC receives written comments from affected agencies and the public on the Notice of Preparation (NOP).

CPUC Project Manager holds EIR SCOPING MEETINGS to receive input from affected agencies and the public on the issues and alternatives which should be considered in the Draft EIR.

CPUC prepares and issues DRAFT EIR (DEIR) for public comment.

CPUC may conduct public hearings and receives written public comments on the DEIR.

CPUC issues Final EIR (FEIR).

Commission certifies FEIR.

Exhibit E

BUREAU OF LAND MANAGEMENT (BLM) AND U.S. FOREST SERVICE (FS) DECISIONMAKING PROCESS FOR MAJOR POWERLINE PROJECTS

Federal agencies such as the Bureau of Land Management (BLM) and the U.S. Forest Service (USFS) are required to process any application for permission to build any project, such as a powerline, across public lands or National Forest. A major powerline project would require completion of an Environmental Impact Statement (EIS) and approval of a right-of-way grant or special use permit before any construction could occur. The EIS and right-of-way/permit process is as follows:

1) The applicant submits a formal, written application.

2) The Federal agencies determine that the project requires preparation of an EIS, or preparation of a combined EIS and Environmental Impact Report (EIR) with the appropriate state agency.

3) A Lead Federal Agency is designated, usually based on the magnitude of the agency's involvement and the project approval/disapproval authority.

4) A formal Notice of Intent to prepare an EIS is published in the Federal Register and sent to interested parties to inform them that an EIS will be prepared.

5) The Notice of Intent begins the "Scoping Process" which includes a request for written comments, plus holding public meetings to determine the issues that the public and other agencies wish to see addressed by the EIR/EIS.

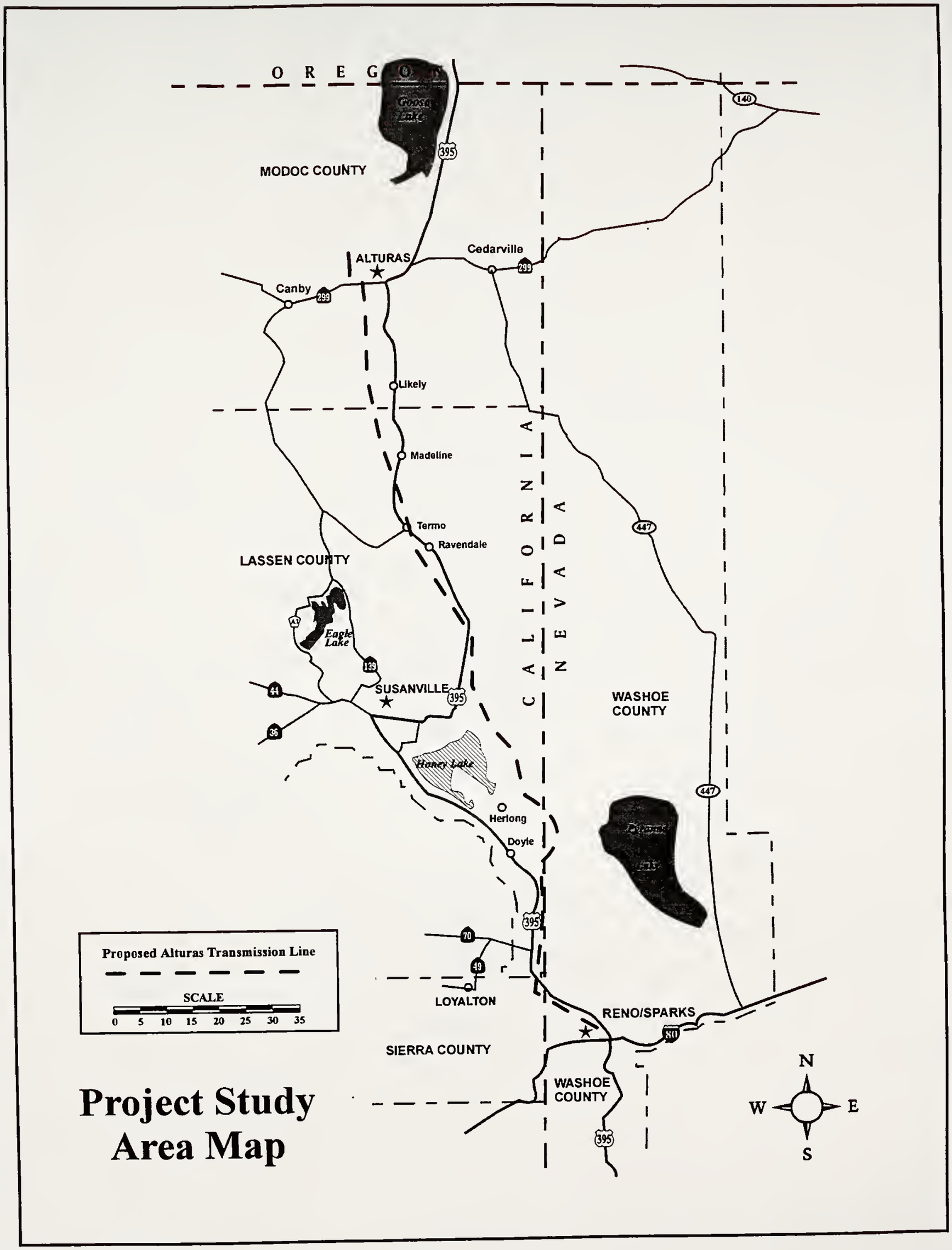
6) A Draft EIR/EIS that analyzes the environmental impacts of the proposed project, and various alternatives, is prepared by the State/Federal lead agencies or an independent third-party contractor selected by the lead agencies.

7) A formal Notice of Availability of the Draft EIR/EIS is published in the Federal Register and mailed to all interested parties, informing the public that the Draft EIR/EIS is available for review and comment. Interested parties are provided with the opportunity to review and comment on the Draft EIR/EIS. This comment period is a minimum of 45 days after the Federal Register Notice of Availability of the Draft EIR/EIS.

8) The lead agencies (through the contractor) will review and prepare responses to all comments as part of the EIR/EIS process. The lead agencies (through the contractor) will then prepare a Final EIR/EIS based on the Draft EIR/EIS and the comments provided by the public and other agencies.

9) A Notice of Availability of the Final EIR/EIS will be published in the Federal Register and mailed to all interested parties, informing them that the Final EIR/EIS is available for distribution.

10) Written Records of Decision are prepared separately by the BLM and the USFS, approving or denying the proposed project. **These Decisions may be made no sooner than 30 days after publication in the Federal Register of the Notice of Availability of the Final EIS.** These Records of Decision must state what the decision was, identify all alternatives considered in reaching the decision, specify the alternative or alternatives considered to be environmentally preferable, and state whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not. The Decisions of the BLM and USFS are subject to a formal appeal process.


O R E G O N
MODOC COUNTY
ALTURAS
Canby
Cedarville
Likely
Madeline
Termo
Ravendale
LASSEN COUNTY
Eagle Lake
SUSANVILLE
Honey Lake
Herlong
Doyle
CALIFORNIA
NEVADA
WASHOE COUNTY
LOYALTON
SIERRA COUNTY
RENO/SPARKS
WASHOE COUNTY
Proposed Alturas Transmission Line
SCALE
0 5 10 15 20 25 30 35
N
W
E
S
Project Study Area Map

Mailing List Registration Form _____

Proposed Alturas Transmission Line

Name: _____

Affiliation (if any): _____

Address: _____

City: _____ **State:** _____ **ZIP:** _____

Phone: (___) _____

☐ Please notify me of the availability of the Draft Environmental Impact Report/Statement (EIR/S) and informational workshops on it.

☐ Please notify me of public participation hearings conducted by the CPUC on the Proposed Alturas Transmission Line Project.

Speaker Registration Card _____

Proposed Alturas Transmission Line

If you plan to make an oral comment regarding the proposed project at this scoping meeting, please fill in the information below and submit the card to the moderator. Also, please submit your oral comments in writing on the ***EIR/S Environmental Issues Questionnaire***. Oral comments are limited to 5 minutes. Speakers will be called in the order registered.

Name: _____

Affiliation (if any): _____

Address: _____

City: _____ **State:** _____ **ZIP:** _____

Phone: (___) _____

Summary of Comments: _____

Exhibit I

EIR/S Environmental Issues Questionnaire _____

Proposed Alturas Transmission Line

Name: _____

Affiliation: _____

Address: _____

City: _____ **State:** _____ **ZIP:** _____

Phone: ( ) _____

- What environmental issues do you think should be addressed in the EIR/S?

_____

_____

_____

_____

_____

_____

- Are there any additional issues or concerns that you would like to bring to the CPUC's attention?

_____

_____

_____

_____

_____

_____

- Do you have any questions, comments or suggestions about the public involvement process?

_____

_____

_____

_____

_____

_____

Please either deposit this questionnaire at the table before you leave today, or fold, seal and mail before May 27, 1994. Insert additional sheets if needed.

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
and the
CALIFORNIA PUBLIC UTILITIES COMMISSION

NOTICE OF PUBLIC SCOPING MEETINGS AND REQUEST FOR COMMENTS ON THE PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT/STATEMENT FOR THE PROPOSED ALTURAS INTERTIE PROJECT

May 3, 1994

The Bureau of Land Management (BLM) and the California Public Utilities Commission (CPUC) are cooperating in the preparation of a joint Environmental Impact Report (EIR) and Environmental Impact Statement (EIS) to analyze the environmental impacts of a proposed 345,000 volt power transmission line in northeastern California northwestern Nevada. Public Scoping Meetings will be held in May 1994 to discuss the Alturas Intertie Project proposed by Sierra Pacific Power Company and the scope of the EIR/S and to receive comments from affected agencies and the public on the issue and alternatives which should be considered in the Draft EIR/S.

Public Scoping Meetings will be held on the following dates:

- **Susanville: Tuesday, May 17, 1994**
  6 p.m., Monticola Club,
  140 South Lassen St., Susanville Calif.

- **Alturas: Wednesday, May 18, 1994**
  6 p.m., Modoc Middle School,
  906 W. 4th St. Alturas, Calif.

- **Reno/Sparks: Thursday, May 19, 1994**
  6 p.m., Best Western McCarran Inn,
  55 E. Nugget Ave., Sparks, Nevada

Summary of the Proposed Project

Sierra Pacific Power Company (SPPCo) of Reno, Nevada, has submitted an application for a certificate of public convenience and necessity from the CPUC and right-of-way applications to the Bureau of Land Management and the United States Forest Service for the purpose of constructing, operating and maintaining a 345KV electric power transmission line from Alturas to Reno. Permits would also be needed from the Public Service Commission of Nevada. The line would tap into a Bonneville Power Administration electric transmission line north of Alturas, CA, and run approximately 160 miles south to tie into the existing SPPCo electric power grid near Reno, NV.

The proposed route generally parallels U.S. Highway 395 from Alturas to the vicinity of Wendel, CA, then runs east of Honey Lake and Herlong, CA, then south in the vicinity of Highway 395 again to the Reno area. This proposed route parallels the proposed Tuscarora gas pipeline route for much of the distance between Alturas and Herlong. The proposal includes the construction of two new electrical substations, one northwest of Alturas and one near Bordertown, Nevada. The existing SPPCo North Valley Road substation, off of McCarran Blvd. in Reno, would be improved to allow a tie-in by the new 345KV line.

SPPCo proposes to build the powerline using tubular steel H-Frame structures, made of a steel which will weather to a dark brown color. The structures would support six non-reflective ("non-specular") stranded aluminum/steel conducting wires (one inch in diameter), arranged in three pairs of two wires, plus two steel "shield" wires which protect the line from lightning strikes. The shield wires would be 3/8" diameter stranded steel wires with fiber optic cables inside the wires for SPPCo transmission operational communications. The proposed line route would follow existing dirt and paved roads to the extent possible. New road construction would be limited as much as possible, and there are likely to be areas where the structures would be installed using helicopters.

SPPCo wishes to build this line to provide increased reliability and electric power capability to the Reno/Lake Tahoe area. The Public Service Commission of Nevada, through a recent electric resource planning process, has approved the Alturas Intertie as SPPCo's least expensive way to increase its ability to bring power to northeastern California and Nevada from neighboring power systems.

A detailed description of the proposal is contained in the "Proponent's Environmental Assessment" submitted by SPPCo to the CPUC as part of the application. Copies of this document are available for review at the following locations:

Bureau of Land Management
Susanville District Office
705 Hall Street
Susanville, CA 96130
(916) 597-5381

California Public Utilities Commission
Commission Advisory and Compliance Division
505 Van Ness Avenue, Room 3207
San Francisco, CA 94102
(415) 703-2776

Bureau of Land Management
Carson City District Office
1535 Hot Springs Road,
Suite #300
Carson City, NV 89706

Bureau of Land Management
Eagle Lake Resource Area
Johnstonville Road
Susanville, CA 96130
(916) 257-0456

Bureau of Land Management
Alturas Resource Area
608 W. 12th Street
Alturas, CA 96101

Sierra Pacific Power Company
Environmental Affairs Department
6100 Neil Road
Reno, NV 89520
(702) 689-4429

<u>The EIR/EIS Process</u>

The BLM, Susanville District, Eagle Lake Resource Area will, together with the CPUC direct the preparation of a joint EIR/EIS to be prepared by a third party contractor. The BLM will be the lead Federal agency, and with the CPUC as the lead California State agency will produce this joint EIR/EIS to satisfy the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), respectively. The EIS/EIR will assess the environmental impacts of the approval, construction, operation and maintenance of a 345,000 volt (345KV) electric power

transmission line approximately 160 miles long, running from the vicinity of Alturas, California through Modoc, Lassen, and Sierra Counties, California, through Washoe County, Nevada to the vicinity of Reno, Nevada. The project has been proposed by the Sierra Pacific Power Company of Reno, Nevada, and is referred to as the Alturas Intertie Project. The project would affect Federal, State and private lands.

BLM - NEPA requires the BLM to take into account the environmental impacts that could result from a major Federal action. As required by NEPA, Environmental Impact Statements are to be included in every recommendation of report on proposals significantly affecting the quality of the human environment.

CPUC - The CPUC regulates the services and rates of privately-owned, intrastate utilities and transportation companies which offer services to the public. Much of the CPUC's regualtion is carried out through judicial and legislative style processes uner the direction of an Administrative Law Judge and, untilmately, the Commissioners. Requests for CPUC authority move through standard CPUC decision processes, as defined in the CPUC Rules of Practice and Procedure, the Public Utilities Code and CPUC General Orders. CPUC General Order 131-C requires utilities to seek Commission authorization (in the form of a Certificate of Public Convenience and Necessity, or CPCN) for proposed transmission facilities greater than 200 kilovolts (200,000 volts). The purpose of the CPCN process is to enable the CPUC to make a determination regarding the need for the project, and to evaluate the project's proposed design and engineering, compliance with all applicable laws, and impact on the environment.

For development projects which require discretionary approval from a state agency, the CEQA requires agencies to prepare and certify and EIR assessing the potential environmental impacts of the proposed project, and if significant impacts would occur, to discuss methods for mitigating those impacts. The joint EIS/EIR we are preparing will provide the BLM and the CPUC the information needed to make a decision based on understanding of environmental consequences, and take actions that protect, restore and enhance the environment.

Impacts to be Analyzed in the EIS/EIR

The EIS/EIR will discuss impacts that could occur as a result of the construction, operation and maintenance of the proposed project. Discussion of the potential impacts would include, but not be limited to, the following subjects:

Visual Resources:

- Impact on visual/aesthetic resources including residential areas, key scenic areas, recreation areas, travel routes, etc.

Cultural Resources:

- Effect on properties listed on or eligible for the National Register of Historic Places.
- Native American and tribal concerns.
- National Historical Trail Study Area concerns.

Biological Resources:

- Impact on wetland and riparian biologic resources.
- Impact on native vegetative communities, including spread of noxious weeds.
- Short and long-term effects of right-of-way clearing, operation and maintenance.
- Impacts on all special status species.
- Impacts on aquatic species.
- Impacts on migratory patterns of birds and mammals, and displacement of non-migratory species.
- Impacts associated with bird strikes or electrocutions on the powerline.

- Impacts associated with changed raptor/prey interactions.
- Impacts on wild horses and burros and on livestock.

Water Resources:

- Effect on potable water supplies.
- Effect on surface water quality.
- Impact on floodplain and wetland benefits.
- Impact of stream and river crossings on hydrology.

Geology and Soils:

- Erosion potential.
- Geologic hazards with respect to tower and substation locations.
- Effects on soil productivity of croplands and non-croplands.
- Soil capability for right-of-way restoration and maintenance.

Land Use:

- Impact on residences, schools, public buildings.
- Impact on future management options or planned use of public and private lands.
- Impact on agricultural, commercial and industrial areas and operations.
- Impact on recreational uses of public and private lands, including effects on recreational travel (trails, roads, etc.)

Socioeconomics:

- Impacts of temporary increases in population due to construction crews (need for temporary housing, camping areas and services).
- Effects of increased fiber optic capability for communities along route.
- Effects of increased availability and reliability of electric power in northeast California and northwest Nevada.
- Effects on employment.
- Effects on rural tourism and on character of rural areas - rural communities.
- Impacts on livestock grazing operations due to construction and rehabilitation activities during grazing seasons.

Air Quality:

- Effects of dust and construction equipment engines.
- Effects of increased electrical power supply on air quality in the Truckee Meadows, Lake Tahoe and Honey Lake Valley areas.

Noise:

- Effect of construction, maintenance, and operations on nearby noise-sensitive receptors including wildlife.

Health and Safety:

- Fire hazards due to line breaks, lightning, construction and maintenance vehicles.
- Safety concerns in vicinity of airports and helicopter base stations (Alturas, Ravendale, BLM Ravendale Fire Station, Sierra Army Depot, etc.)
- Effects of electromagnetic fields (EMF).
- Effects on public agency emergency communications and other radio, cellular phone and television transmission.

Alternatives:

- Impacts of route variations to avoid known sensitive areas, level of inventory on these variations.

Cumulative Impacts:

- Growth inducing impacts of this project combined with other known projects.
- Identification of other related projects.
- Cumulative impacts of the construction crews associated with this project, the Tuscarora gas pipeline project, and the Susanville Correctional Center expansion.

The EIS/EIR will also evaluate possible alternatives to the project. Alternatives to be addressed in the EIS/EIR include not building the project, building the project on various alternative routes, other transmission system alternatives, improving energy conservation efforts, and developing alternative sources of power.

Our independent analysis of the environmental issues will result in the publication of a Draft EIS/EIR which will be mailed to Federal, State and local agencies, Indian tribes, public interest groups, interested individuals, *affected landowners*, newspapers and libraries. *A 45-day comment period will be provided for the review of the Draft EIS/EIR.* We will consider all comments on the Draft EIS/EIR and revise the document, as necessary, before issuing a Final EIS/EIR. The Final EIS/EIR will include our response to each comment received. Following completion of the EIS/EIR, the responsible agencies will use that EIS/EIR to issue separate Decisions on the proposed project.

Public Participation and Scoping Meetings

NEPA (and CEQA) also requires us to discover and address concerns the public and other governmental agencies may have about a proposed project. This process is called "scoping". The main goal of the scoping process is to focus the analysis in the EIS/EIR on the important environmental issues, and to separate those issues that are not significant and do not require detailed study. The EIS/EIR will also evaluate possible alternatives to the project, or portions of the project, and make recommendations on how to avoid or lessen environmental impacts of the project.

The purpose of this notice is to invite members of the public, affected Federal, State, and local agencies, any affected Indian tribes, the proponent of the action, and other interested persons to participate in the scoping process for this project by providing written and verbal comments or recommendations concerning the issues to be analyzed in the EIS/EIR.

You can make a difference by sending a letter with your specific comments or concerns about the project. You should focus on the potential environmental effects of the proposed project and alternatives, and measures to avoid or lessen any potential environmental impacts. The more specific your comments, the more useful they will be. Please address written comments to:

Julie Halligan, CPUC Project Manager,
Environmental and Energy Advisory Branch,
505 Van Ness Ave, San Francisco, CA 94102

Written comments should reference CPUC Application No.93-11-018, and BLM case number CACA-31406, or the "Alturas Intertie Project". **Written comments will be accepted until Tuesday, May 24, 1994.**

In addition to asking for written comments, we invite you to attend any of the scoping meeting listed above. The meetings will be designed to provide you with more detailed information and another opportunity to offer your comments on the proposed project. A transcript of each meeting will be made so that your comments will be accurately recorded.

If you do not want to send comments at this time but still want to be informed about the project, you may contact:

Peter Humm, BLM Project Manager
Eagle Lake Resource Area,
Bureau of Land Management,
705 Hall Street,
Susanville, CA 96130
(916) 257-5381

Julie Halligan
California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102

(415) 703-2776

Table B-1 Matrix of Comments Subsequent to EIR/S Scoping Period, by Commentor and Environmental Issue Area

Commentor	Date of Comment Letter	Project Descrip. / Purpose/ Need	Alternatives	Air	Biology	Cultural	Energy/ Utilities	Geology/ Soil/ Paleon-tology	Hydro-logy	Land	Noise	Public Safety/ Health	Socio-economics/ Public Services	Trans-portation Traffic	Visual	Cumula-tive/ Growth Induce-ment
Citizen Groups																
National Audobon Society	11/16/94	✓	✓		✓										✓	
Suprise Valley Chamber of Commerce	10/19/94		✓			✓				✓			✓		✓	
Independent Commentors																
Lee Roger Anderson	09/23/94	✓														
Ed & Sharon Berryessa	10/24/94		✓													
Eloy P. Chaues	10/24/94	✓														
Gordon & Marilyn Dick	10/10/94	✓					✓									
William & Marqurite Duncan	10/29/94		✓		✓											
Honey Lake Industries, Inc.	10/21/94	✓								✓						✓
Thomas F. Krauel	11/07/94 11/18/94				✓											
Esther Levine	10/10/94	✓														
Lynette Shoemaker	11/07/94		✓												✓	
Barry & Nettie Slater	10/10/94	✓	✓													
Mark Soderberg	10/10/94	✓													✓	✓
Government Agencies																
State of California, Regional Water Quality Control Board - Lahontan Region	11/14/94								✓			✓				✓
State of California, State Lands Commission	07/30/94							✓	✓	✓		✓				✓

Alturas Transmission Line EIR/S

CPUC Application No. 93-018-11,
U.S. BLM Application for Right-of-Way Grant, Case # CACA-31406

PUBLIC NOTICE

As you may know, Sierra Pacific Power Company (SPPCo.) has submitted applications for construction and operation of a 345 kilovolt (kV) transmission line from Alturas in Modoc County, through Lassen and Sierra Counties, to the Reno area (Washoe County) in Nevada. The California Public Utilities Commission (CPUC), the State Lead Agency under the California Environmental Quality Act (CEQA), and the U.S. Bureau of Land Management (BLM), the Federal Lead Agency under the National Environmental Policy Act (NEPA), are preparing an Environmental Impact Report/Statement (EIR/S) on this proposed project. The Draft EIR/S is currently scheduled for release in late February, 1995.

SPPCo has recently submitted an Amendment to its Application for a Certificate of Public Convenience and Necessity to the CPUC for the construction of the Alturas Transmission Line Project. This Amendment states that the Alturas Transmission Line "adds the potential for providing future cost-effective, reliable electric service to the Lassen community to the general Project objective of providing such services to other potential users." Furthermore, SPPCo states in the Amendment that it is likely to execute a conditional Letter of Understanding (LOU) with Lassen Municipal Utility District (LMUD) for this purpose in the near future. Such future service to LMUD customers would be provided by a lateral line which has not yet been designed or sited. This lateral line would tie into the Alturas Transmission Line in eastern Lassen County, probably somewhere in the Wendel area, no earlier than year 2004.

The Alturas Transmission Line EIR/S in its analysis of the Proposed Project will include analysis of the potential LMUD connection. The assessment in this EIR/S would not preclude more detailed environmental consideration of such a connection in the future when specific plans and routing proposals become available.

If you have any comments, or need information you may write or call:

Julie Halligan
Alturas EIR/S Project Manager
CPUC
505 Van Ness Avenue, Room 3207
San Francisco, CA 94102
(415) 703-2776

Peter Humm
Alturas EIR/S Project Manager
U.S. BLM, Susanville District
705 Hall Street
Susanville, CA 96130
(916) 257-0456

Appendix C
Base Maps

APPENDIX C

BASE MAPS AND SEGMENT/STRUCTURE COORDINATE SUMMARY

VOLUME II

APPENDIX C

C.1 Base Maps

C.2 Segment/Structure Coordinate Summary

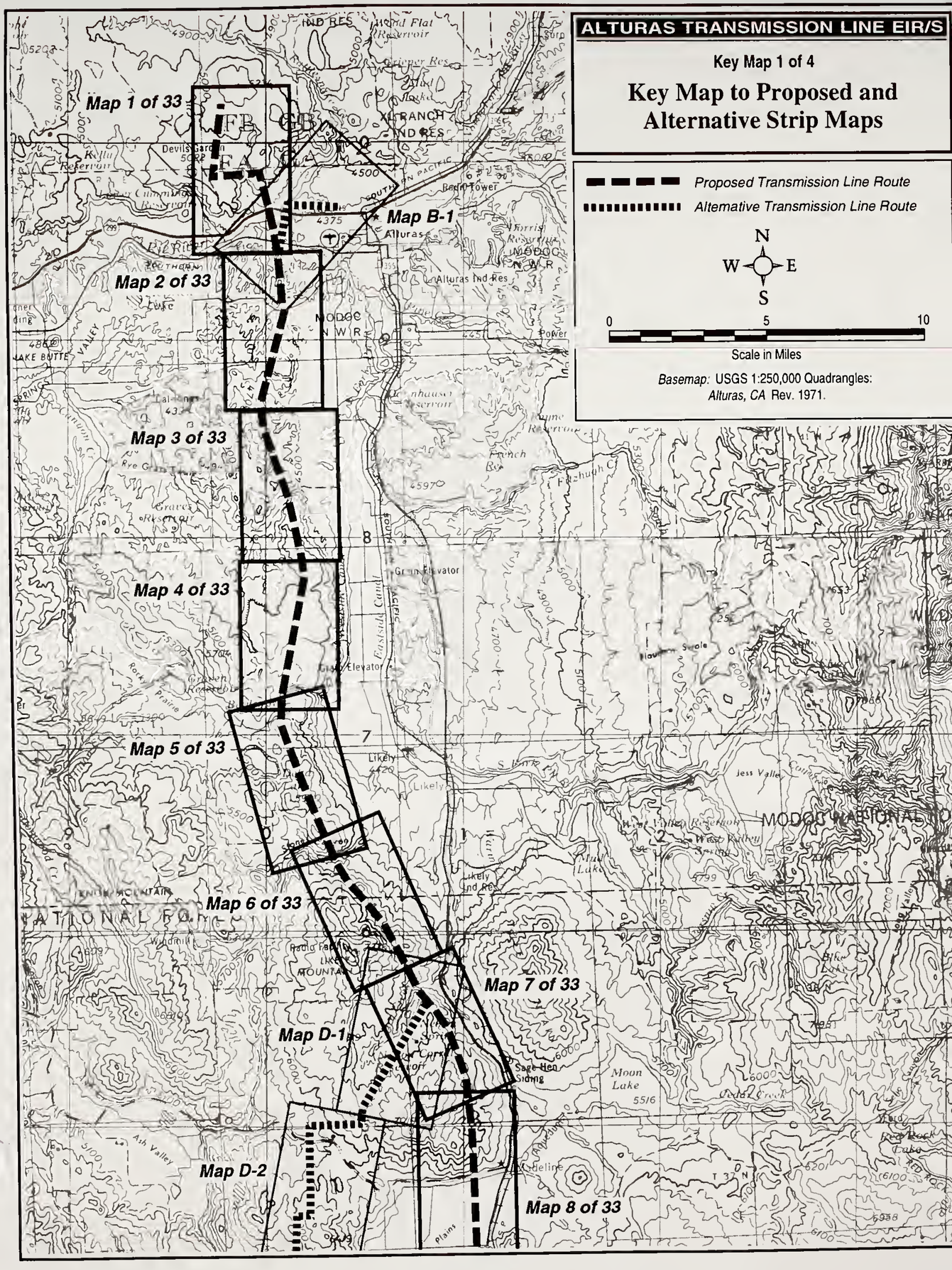
VOLUME II

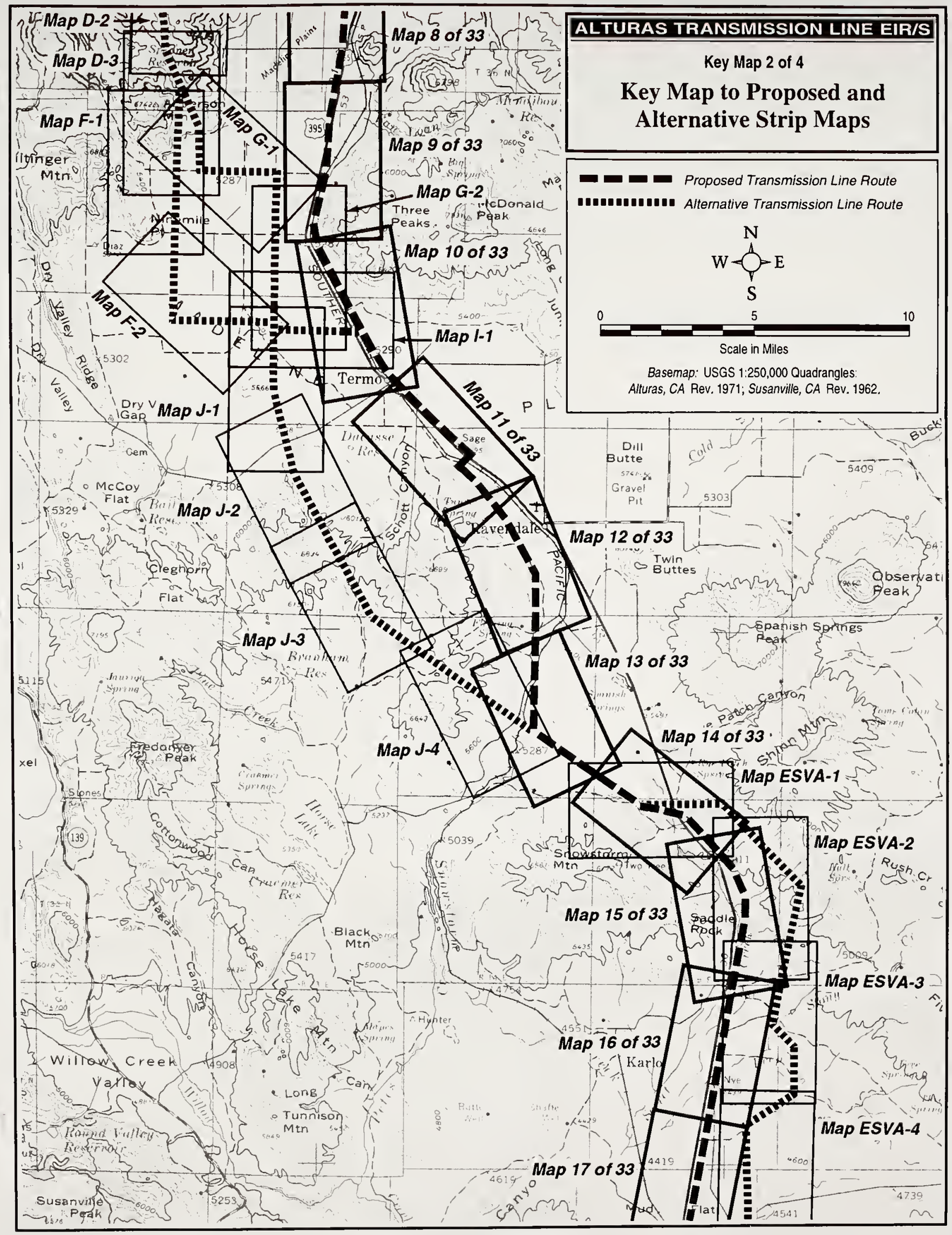
APPENDIX C.1 BASE MAPS

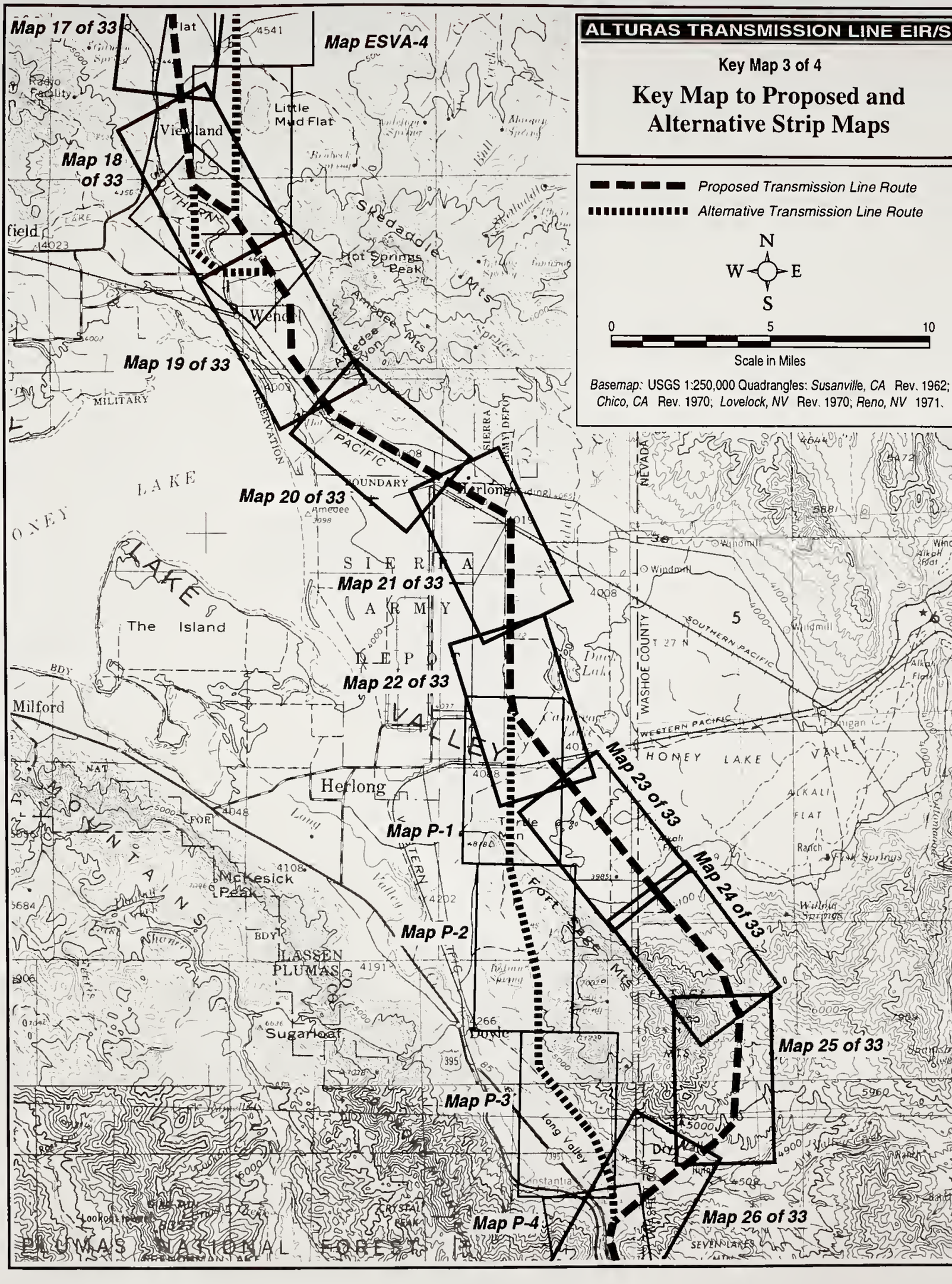
APPENDIX C.1 BASE MAPS

1) 33 pages of maps for the Proposed Route
2) 1 map for the B Alternative Segment
3) 3 pages of maps for the D Alternative Segment
4) 2 pages of maps for the F Alternative Segment
5) 2 pages of maps for the G Alternative Segment
6) 1 map for the I Alternative Segment
7) 4 pages of maps for the J Alternative Segment
8) 5 Pages of maps for the ESVA Segment
9) 1 map for the M Alternative Segment
10) 4 pages of maps for the P Alternative Segment
11) 1 map for the S and U Alternative Segments
12) 1 map for the Z Alternative Segment
13) 1 map for the WCFG Alternative Segment
14) 1 map for the X-East Alternative Segment

Note: *These detailed maps of the Proposed Route and alternative alignments are based on topographic maps prepared by the U.S. Geological Survey (USGS). The base maps are only as current as the last update by the USGS, and may not reflect all of the features now present. However, the EIR/S analysis intends to consider all existing features. Please refer to the "Environmental Baseline and Regulatory Setting" sections in each issue area for current information.*


ALTURAS TRANSMISSION LINE EIR/S
Key Map 1 of 4
Key Map to Proposed and Alternative Strip Maps
Proposed Transmission Line Route
Alternative Transmission Line Route
N
W
E
S
0
5
10
Scale in Miles
Basemap: USGS 1:250,000 Quadrangles: Alturas, CA Rev. 1971.
Map 1 of 33
Map 2 of 33
Map 3 of 33
Map 4 of 33
Map 5 of 33
Map 6 of 33
Map 7 of 33
Map 8 of 33
Map B-1
Map D-1
Map D-2
Alturas
MODOC NWR
MODOC NATIONAL FO
Likely
Sage Hen Siding
Moon Lake
Devils Garden
Fall River
Grasshopper Flat Reservoir
Crimper Res
Ravenswood
Grasshopper Flat
Alturas Ind Res
Lake Butte
Spring Valley
Rye Grass
Graves Reservoir
Grain Elevator
Bassett Canal
Pork Prairie
Crowell Reservoir
Jess Valley
Mud Lake
Likely Ind Res
Windmill
Ash Valley
Plains
Madeline
Red Rock Table
Dodge Creek
Radio Tower
Power
Franch Res
Fazzhugh Ck
Wilson Reservoir
Harris Reservoir
Dorris Reservoir
Modoc Point
Swale
Sage Hen Creek
Knox Mountain
Paiute Mountain
Windmill
Ranch
Ind Res
Reservoir
Creek
Lake
Valley
Spring
Prairie
Mountain
Siding
Tower
Power
Elevator
Res
Ck
Canal
Point
Table
Rock
Creek
Swale
Plains
Madeline
Ash Valley
Moon Lake
Sage Hen Siding
Likely
Alturas
Alturas Ind Res
Modoc Point
Swale
Jess Valley
Mud Lake
Likely Ind Res
Windmill
Ash Valley
Plains
Madeline
Red Rock Table
Dodge Creek
Sage Hen Creek
Knox Mountain
Paiute Mountain
Windmill
Ranch
Ind Res
Reservoir
Creek
Lake
Valley
Spring
Prairie
Mountain
Siding
Tower
Power
Elevator
Res
Ck
Canal
Point
Table
Rock
Creek
Swale
Plains
Madeline
Ash Valley
Moon Lake
Sage Hen Siding
Likely
Alturas
Alturas Ind Res
Modoc Point
Swale
Jess Valley
Mud Lake
Likely Ind Res
Windmill
Ash Valley
Plains
Madeline
Red Rock Table
Dodge Creek
Sage Hen Creek
Knox Mountain
Paiute Mountain


ALTURAS TRANSMISSION LINE EIR/S
Key Map 2 of 4
Key Map to Proposed and Alternative Strip Maps
Proposed Transmission Line Route
Alternative Transmission Line Route
N
W
E
S
0
5
10
Scale in Miles
Basemap: USGS 1:250,000 Quadrangles:
Alturas, CA Rev. 1971; Susanville, CA Rev. 1962.
Map D-2
Map D-3
Map F-1
Map G-1
Map F-2
Map J-1
Map J-2
Map J-3
Map J-4
Map 8 of 33
Map 9 of 33
Map G-2
Map 10 of 33
Map I-1
Map 11 of 33
Map 12 of 33
Map 13 of 33
Map 14 of 33
Map ESVA-1
Map ESVA-2
Map 15 of 33
Map ESVA-3
Map 16 of 33
Map ESVA-4
Map 17 of 33
Termo
Ravendale
Dill Butte
Gravel Pit
Twin Buttes
Spanish Springs Peak
Observati Peak
McDonald Peak
Three Peaks
Flynger Mtn
McCoy Flat
Cleghorn Flat
Fredonyer Peak
Snowstorm Mtn
Saddle Rock
Black Mtn
Lake Mtn
Tunnison Mtn
Willow Creek Valley
Round Valley Reservoir
Susanville Peak
Dry Valley Ridge
Dry Valley Gap
Schott Canyon
Patch Canyon
Shinn Mtn
Rush Cr
Cold
Buck
Mud Flat
Karlo
Hunter
Sage
Stones
Diaz
Cottonwood
Horse Lake
Juniper Spring
Braunham Res
Cramer Springs
Cramer Res
Bull Spring
Spanish Springs
Patch Canyon
Shinn Mtn
Snowstorm Mtn
Saddle Rock
Black Mtn
Lake Mtn
Tunnison Mtn
Round Valley Reservoir
Susanville Peak
Fredonyer Peak
Twin Buttes
Dill Butte
Gravel Pit
Ravendale
Termo
Cleghorn Flat
McCoy Flat
Dry Valley Gap
Dry Valley Ridge
Schott Canyon
Willow Creek Valley
Long Valley


ALTURAS TRANSMISSION LINE EIR/S
Key Map 3 of 4
Key Map to Proposed and Alternative Strip Maps
Proposed Transmission Line Route
Alternative Transmission Line Route
N
W
E
S
0
5
10
Scale in Miles
Basemap: USGS 1:250,000 Quadrangles: Susanville, CA Rev. 1962; Chico, CA Rev. 1970; Lovelock, NV Rev. 1970; Reno, NV 1971.
Map 17 of 33
Map ESVA-4
Map 18 of 33
Map 19 of 33
Map 20 of 33
Map 21 of 33
Map 22 of 33
Map 23 of 33
Map 24 of 33
Map 25 of 33
Map 26 of 33
Map P-1
Map P-2
Map P-3
Map P-4
Little Mud Flat
Hot Springs Peak
Skedaddle Mts
Amedee Mts
Herlong
Milford
The Island
McKesick Peak
Sugarloaf
Doyle
Long Valley
Honey Lake Valley
Alkali Flat
Fort Sage Mts
Seven Lakes
Plumas National Forest
Lassen
Plumas
Sierra Army Depot
Southern Pacific
Western Pacific
Washoe County
Nevada
Pacific Boundary

ALTURAS TRANSMISSION LINE EIR/S

Key Map 4 of 4

Key Map to Proposed and Alternative Strip Maps

Proposed Transmission Line Route

Alternative Transmission Line Route

N

W E

S

0 5 10

Scale in Miles

Basemap: USGS 1:250,000 Quadrangles: *Susanville, CA* Rev. 1962; *Chico, CA* Rev. 1970; *Lovelock, NV* Rev. 1970; *Reno, NV* 1971.

Map P-4

Map 26 of 33

Map S-1

Map 27 of 33

Map Z-1

Map 28 of 33

Map 29 of 33

Map WCFG

Map 30 of 33

Map X-1

Map 31 of 33

Map 32 of 33

Map 33 of 33

SEVEN LAKES MTN

Red Rock Valley

Beckwourth Pass

Hallelujah Junction

Hungry Valley

Cold Spring Valley

Spanish Springs Valley

Sun Valley

SPARKS

RENO

Reno-Stead

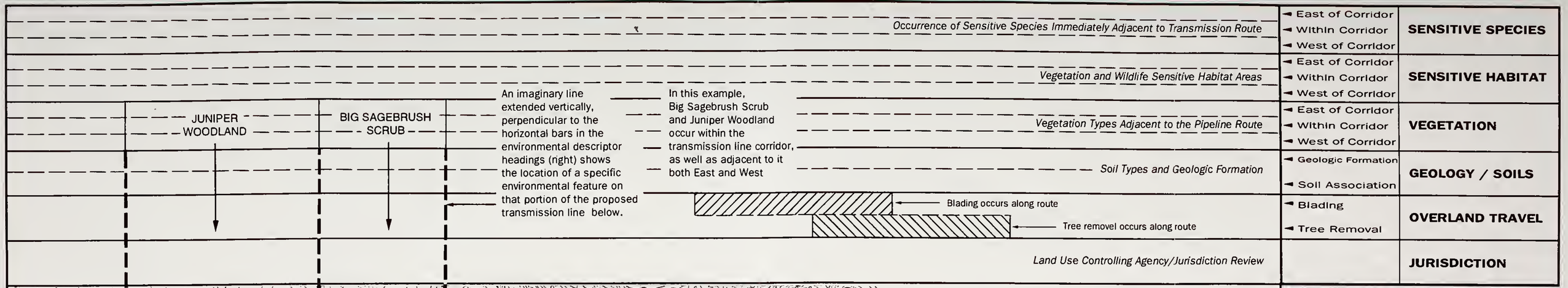
Reno International

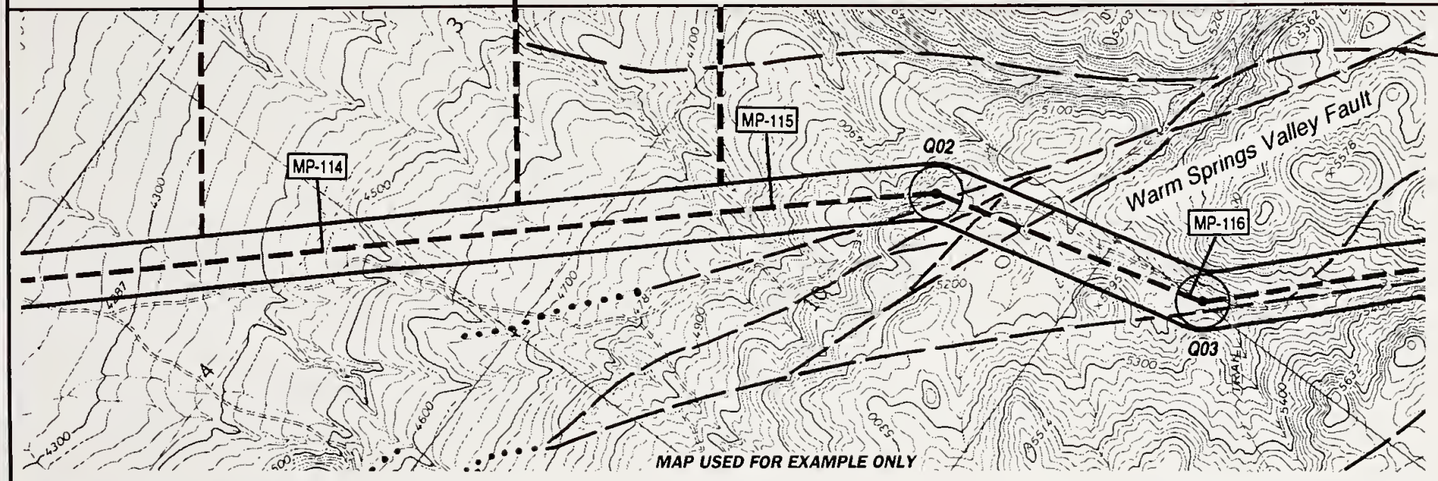
LEMMON VALLEY

SUGARLOAF PEAK

HUFFAKER HILLS

TOIYABE NATIONAL FOREST


Occurrence of Sensitive Species Immediately Adjacent to Transmission Route
East of Corridor
Within Corridor
West of Corridor
SENSITIVE SPECIES
Vegetation and Wildlife Sensitive Habitat Areas
East of Corridor
Within Corridor
West of Corridor
SENSITIVE HABITAT
JUNIPER WOODLAND
BIG SAGEBRUSH SCRUB
An imaginary line extended vertically, perpendicular to the horizontal bars in the environmental descriptor headings (right) shows the location of a specific environmental feature on that portion of the proposed transmission line below.
In this example, Big Sagebrush Scrub and Juniper Woodland occur within the transmission line corridor, as well as adjacent to it both East and West
Vegetation Types Adjacent to the Pipeline Route
East of Corridor
Within Corridor
West of Corridor
VEGETATION
Soil Types and Geologic Formation
Geologic Formation
Soil Association
GEOLOGY / SOILS
Blading occurs along route
Tree removel occurs along route
Blading
Tree Removal
OVERLAND TRAVEL
Land Use Controlling Agency/Jurisdiction Review
JURISDICTION



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker
- Alternative Segment (Mapped)
- Other Alternative Segment

N
W E
S

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s):

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

SENSITIVE SPECIES

AAB	Altered Andesite Buckwheat *(Eriogonum robustum)*
CLB	Clay-loving Buckwheat *(Eriogonum collinum)*
CS	Cusick's Stickseed *(Hackelia cusickii)*
DL	Dwarf Lousewort *(Pedicularis centranthera)*
DOU	Doublet *(Dimeresia howellii)*
FS	Falcate Saltbush *(Atriplex gardneri var. falcata)*
GPP	Green Prince's Plume *(Stanleya viridiflora)*
HL	Henderson's Lomatium *(Lomatium hendersonii)*
HM	Holmgren's Skullcap *(Scutellaria holmgreniorum)*
LL	Lilliput Lupine *(Lupinus uncialis)*
LLSP	Lance-leaved Scurf-pea *(Psoralidium lanceolatum)*
NEP	Nelson's Evening Primrose *(Camissonia minor)*
PB	Prostrate Buckwheat *(Eriogonum prociduum)*
PCEP	Pine Creek Evening Primrose *(Camissionia boothii)*
PL	Purple Loco *(Astragalus agrestis)*
RL	Raven's Lomatium *(Lomatium ravenii)*
SM	Spiny Milkwort *(Polygala subspinosa)*
SMV	Suksdorf's Milk-vetch *(Astragalas pulsiferae)*
TA	Twin Arnica *(Arnica sororia)*
VD	Volcanic Daisy *(Erigeron elegantulus)*

VEGETATION

Altered Andesite
Alturas Volcanic Gravel
Big Sagebrush Scrub
Chenopod Scrub
Disturbed/Cultivated
Juniper Woodland
Low Sagebrush Scrub
Montane Meadow
Mud Flat
Rabbitbrush Scrub
Sagebrush/Bitterbrush Scrub
Silver Sagebrush Scrub
Stabilized/Partially Stabilized Dunes
Yellow Pine Forest

CUMULATIVE PROJECTS

CUM-5 Cumulative Project (Refer to Table B.5-1)

SENSITIVE RECEPTORS

(Refer to Table C.8-1 in Land Use section)

REC 1 Recreation Area
REL 1 Religious
RES 1 Residential
HIS 1 Historical Marker

GEOLOGY

Geologic Formations (Refer to Table C.6-1 & C.6-2)
Soil Associations (Refer to Appendix G Tables)

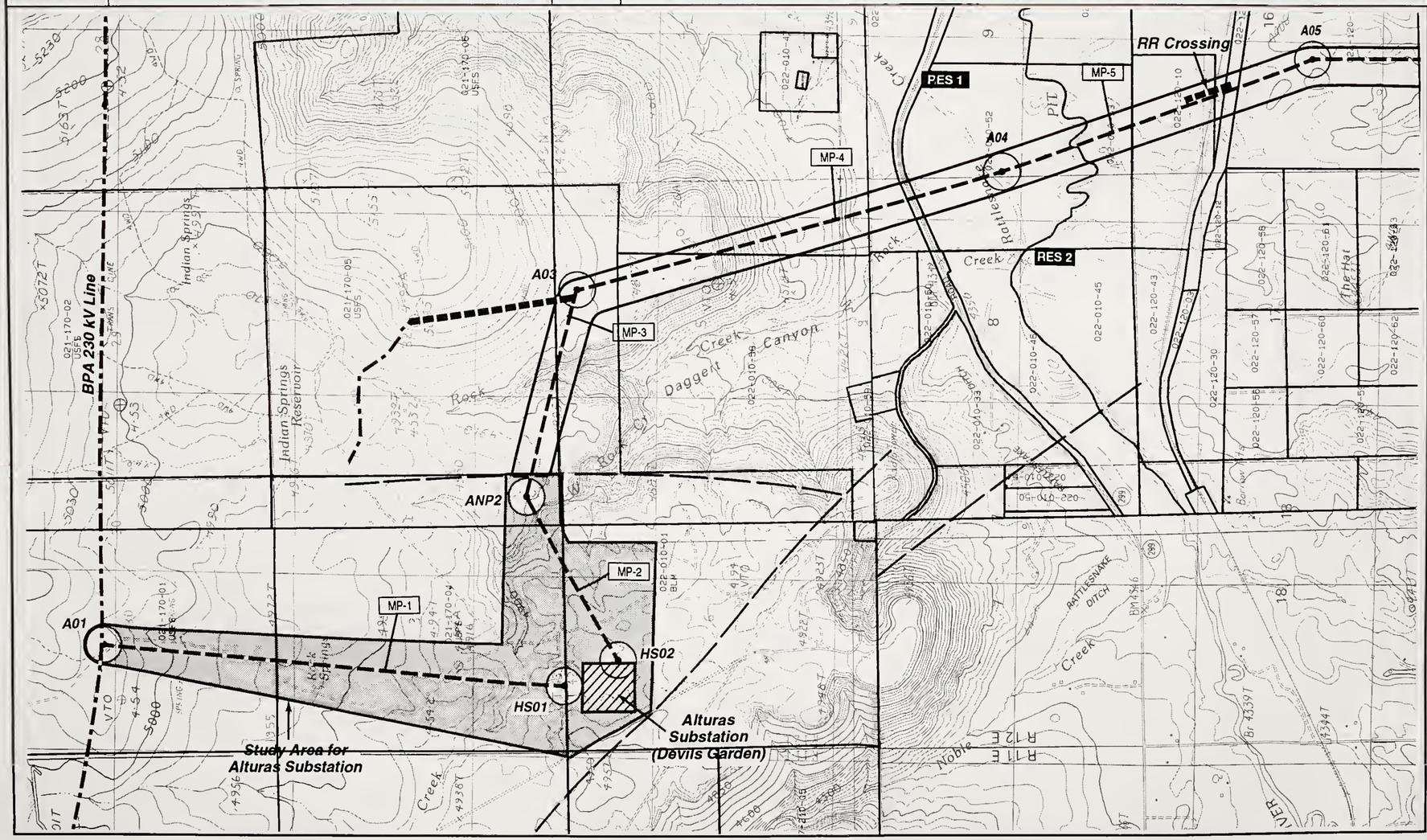
ROADS

New Access Road
Upgrade of Existing Roads

ALTURAS TRANSMISSION LINE EIR/S

Index Map For Proposed and Alternative Transmission Line Route Maps

DOU / PB, LL / LL / LL	◄ East of Corridor ◄ Within Corridor ◄ West of Corridor — **SENSITIVE SPECIES**
WETLAND/ RIPARIAN AREA / DEER MIGRATION CORRIDOR	◄ East of Corridor ◄ Within Corridor ◄ West of Corridor — **SENSITIVE HABITAT**
JUNIPER WOODLAND / BIG SAGEBRUSH SCRUB / MONTANE MEADOW / BIG SAGEBRUSH SCRUB	◄ East of Corridor ◄ Within Corridor ◄ West of Corridor — **VEGETATION**
Qpvb 130-132/Rock Outcrop; Pc/Qpvb; Pc; Qa; Pc; Pc — 130 127 132 146 132 127 109 129 109 118 109 104 103 176 103 118 193 51 193 118 109 118 109 116 109 118	◄ Geologic Formation ◄ Soil Association — **GEOLOGY / SOILS**
	◄ Blading ◄ Tree Removal — **OVERLAND TRAVEL**
USFS / BLM	**JURISDICTION**



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

E N S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Alturas, CA* 1990; *Big Sage Reservoir, CA* 1990.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map 1 of 33

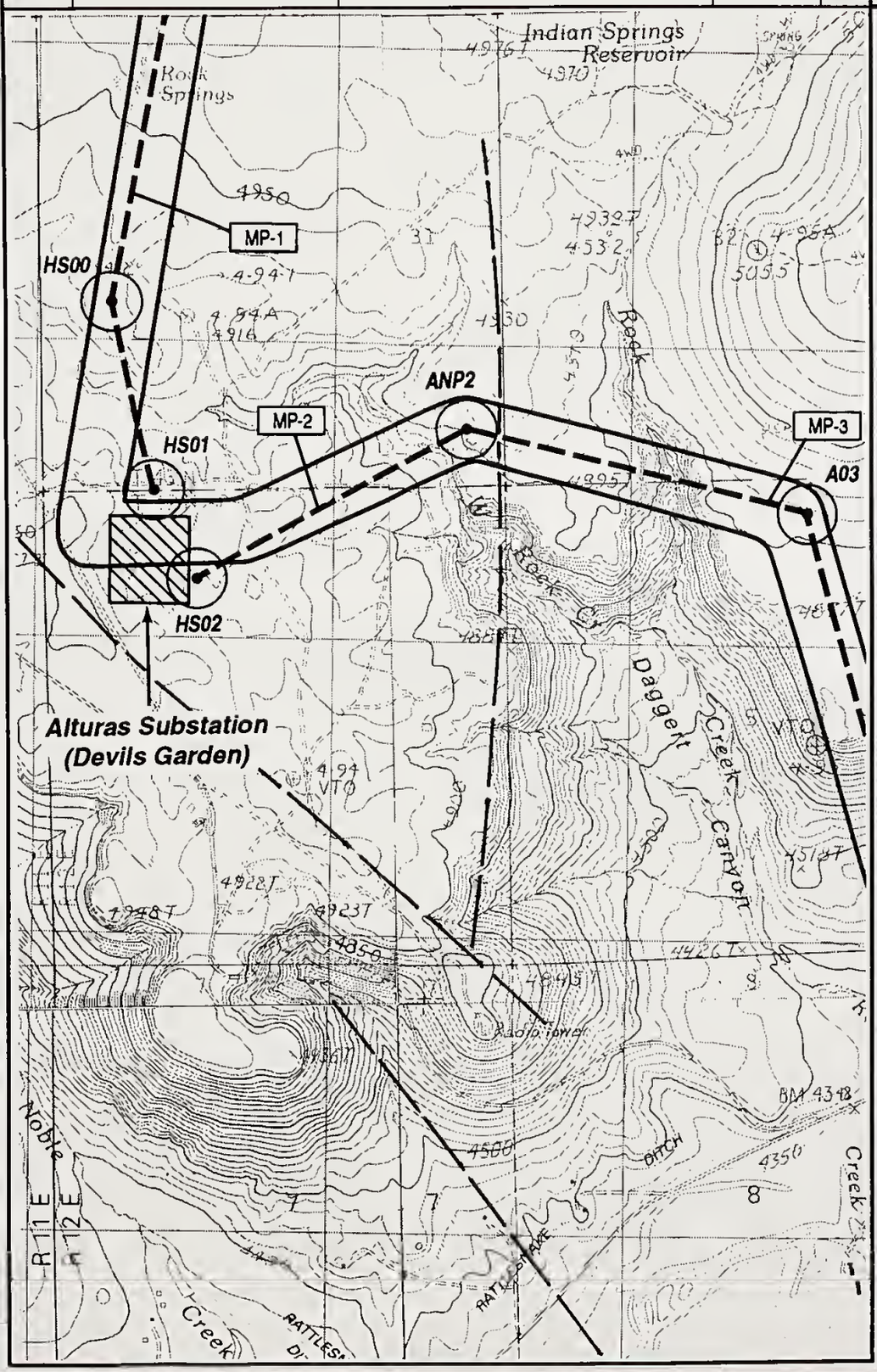
Proposed Route

[Segment A]

◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE SPECIES**
◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE HABITAT**
◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**VEGETATION**
◄ Geologic Formation ◄ Soil Association	**GEOLOGY / SOILS**
◄ Blading ◄ Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

JUNIPER WOODLAND

BLM | USFS | BLM



KEY

Alturas Transmission Line Proposed Route

Angle Point

MP-50 Proposed Route Mile Marker

N W E S

0 2000 4000

Scale in Feet

0 1/2 1

Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Alturas, CA* 1990; *Big Sage Reservoir, CA* 1990.

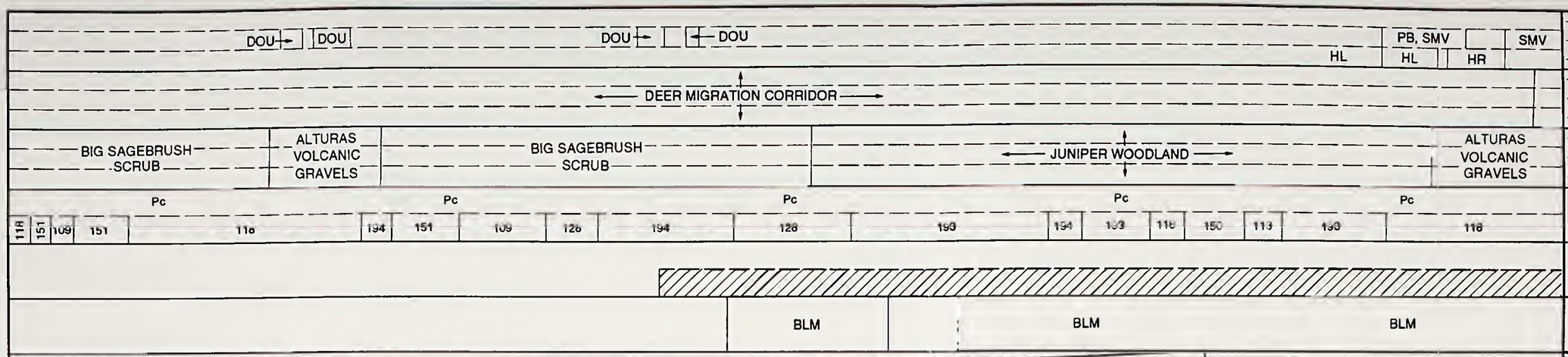
NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map 1a of 33

Proposed Route

[Segment A]



◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE SPECIES**
◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE HABITAT**
◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**VEGETATION**
◄ Geologic Formation ◄ Soil Association	**GEOLOGY / SOILS**
◄ Blading ◄ Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

MP-6
MP-7
MP-6
A06
MP-9
Tuscarora Pipeline
RES 3
CUM-3
CUM-2
CUM-1
MP-10
MP-11
C01
CUM-4
T 42 N
T 41 N
Three Sisters Creek
4WD

KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

E
N S
W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Alturas, CA 1990; Infernal Caverns, CA 1990.*

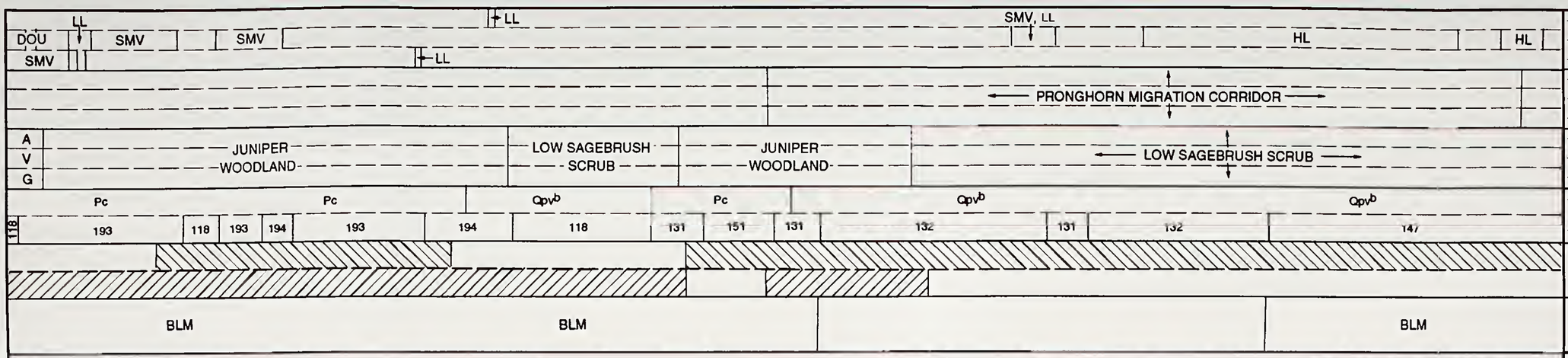
NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

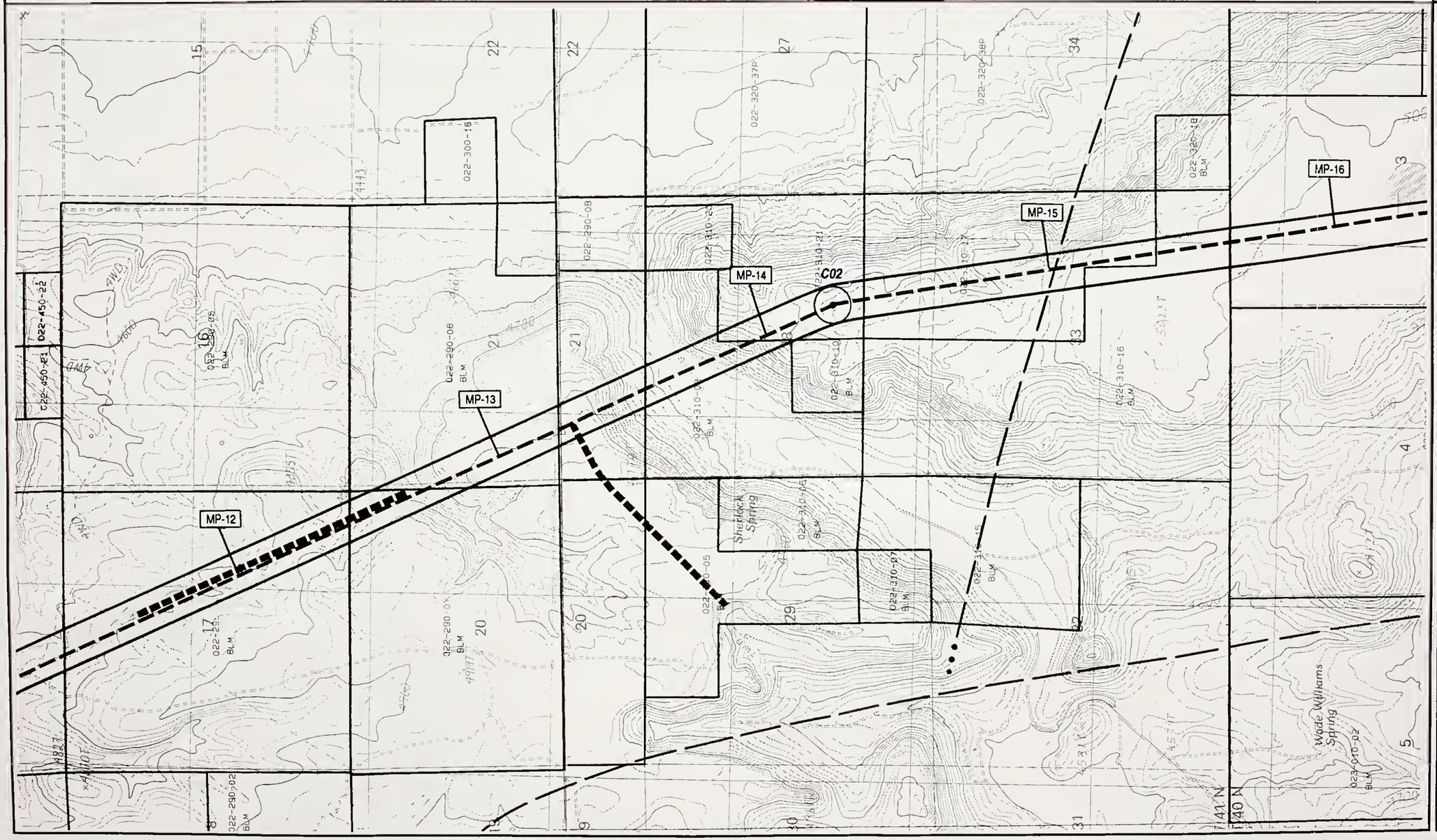
ALTURAS TRANSMISSION LINE EIR/S

Map 2 of 33

Proposed Route

[Segment A & C]





KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

E
N S
W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Infernal Caverns, CA 1990.*

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

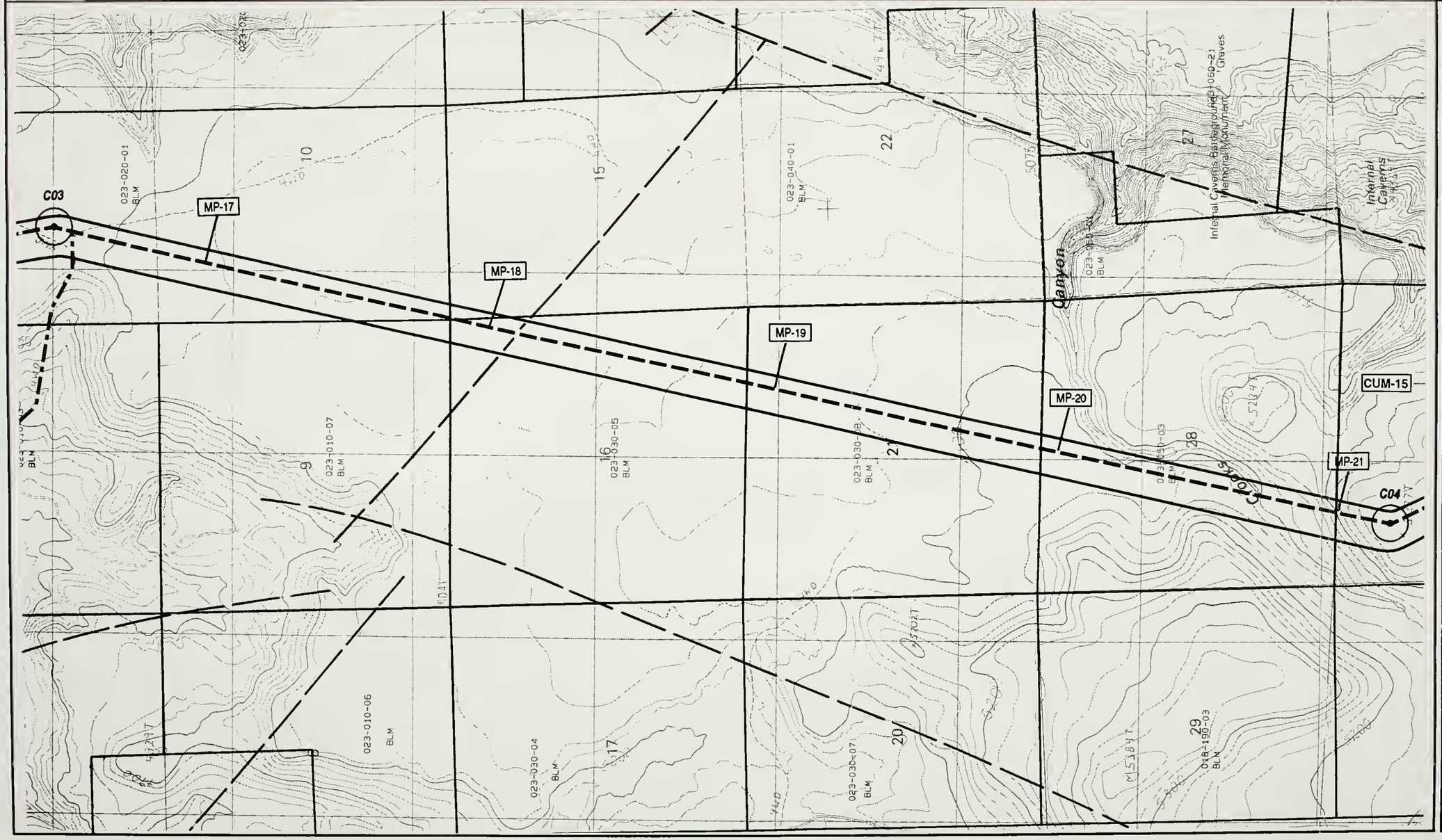
ALTURAS TRANSMISSION LINE EIR/S

Map 3 of 33

Proposed Route

[Segment C]

HL / SMV, HL	SENSITIVE SPECIES — East of Corridor / Within Corridor / West of Corridor
SAGE GROUSE YEAR LONG HABITAT / STREAM WETLAND / SAGE GROUSE	SENSITIVE HABITAT — East of Corridor / Within Corridor / West of Corridor
LOW SAGEBRUSH SCRUB / JUNIPER WOODLAND	VEGETATION — East of Corridor / Within Corridor / West of Corridor
Qpv^b 147; Qpv^b 146; Qpv^b 147; Pv^b 132; 147	GEOLOGY / SOILS — Geologic Formation / Soil Association
	OVERLAND TRAVEL — Blading / Tree Removal
BLM	JURISDICTION



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

E N S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): ***Infernal Cavems, CA 1990; Likely, CA 1990.***

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map 4 of 33

Proposed Route

[Segment C]

HL, HL, HL, CS, TA, CS, CS	East of Corridor / Within Corridor / West of Corridor — **SENSITIVE SPECIES**
RIPARIAN WETLAND	East of Corridor / Within Corridor / West of Corridor — **SENSITIVE HABITAT**
LOW SAGEBRUSH SCRUB; JUNIPER WOODLAND; YELLOW PINE FOREST; JUNIPER WOODLAND; YELLOW PINE FOREST	East of Corridor / Within Corridor / West of Corridor — **VEGETATION**
PVb: 132, 147, 132, 147, 132, 147, 132, 161, 132, 147, 132, 147, 132, 147, 132, 147, 132, 161	Geologic Formation / Soil Association — **GEOLOGY / SOILS**
	Blading / Tree Removal — **OVERLAND TRAVEL**
BLM; BLM; BLM; BLM	**JURISDICTION**

KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

N E S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): ***Likely, CA 1990.***

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map 5 of 33

Proposed Route

[Segment C]

East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

CS
LL
CL
TA
TA
TA
TA
TA
CS
LL
WET LAND
WET LAND
RIPARIAN WETLAND
RIP.
RIPARIAN WETLAND
JUNIPER WOODLAND
YELLOW PINE FOREST
JUNIPER WOODLAND
Pvb
Pvb
Pvb
Pvb
Pvb
161
132
131
132
402
130
157
130
157
293
157
BLM
BLM
USA
USA

KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

E
N S
W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): ***Holbrook Canyon, CA 1990, Likely, CA 1990, Madeline, CA 1975.***

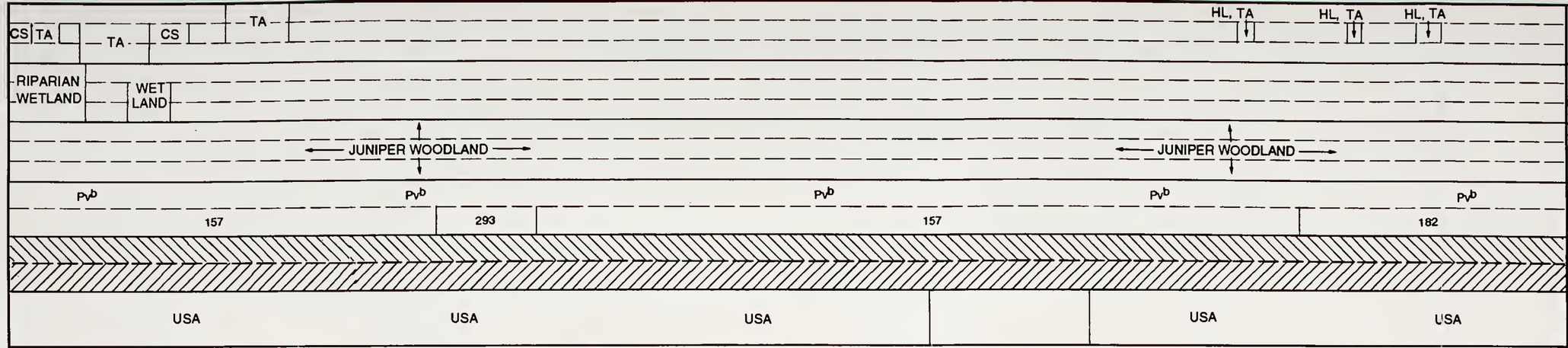
NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

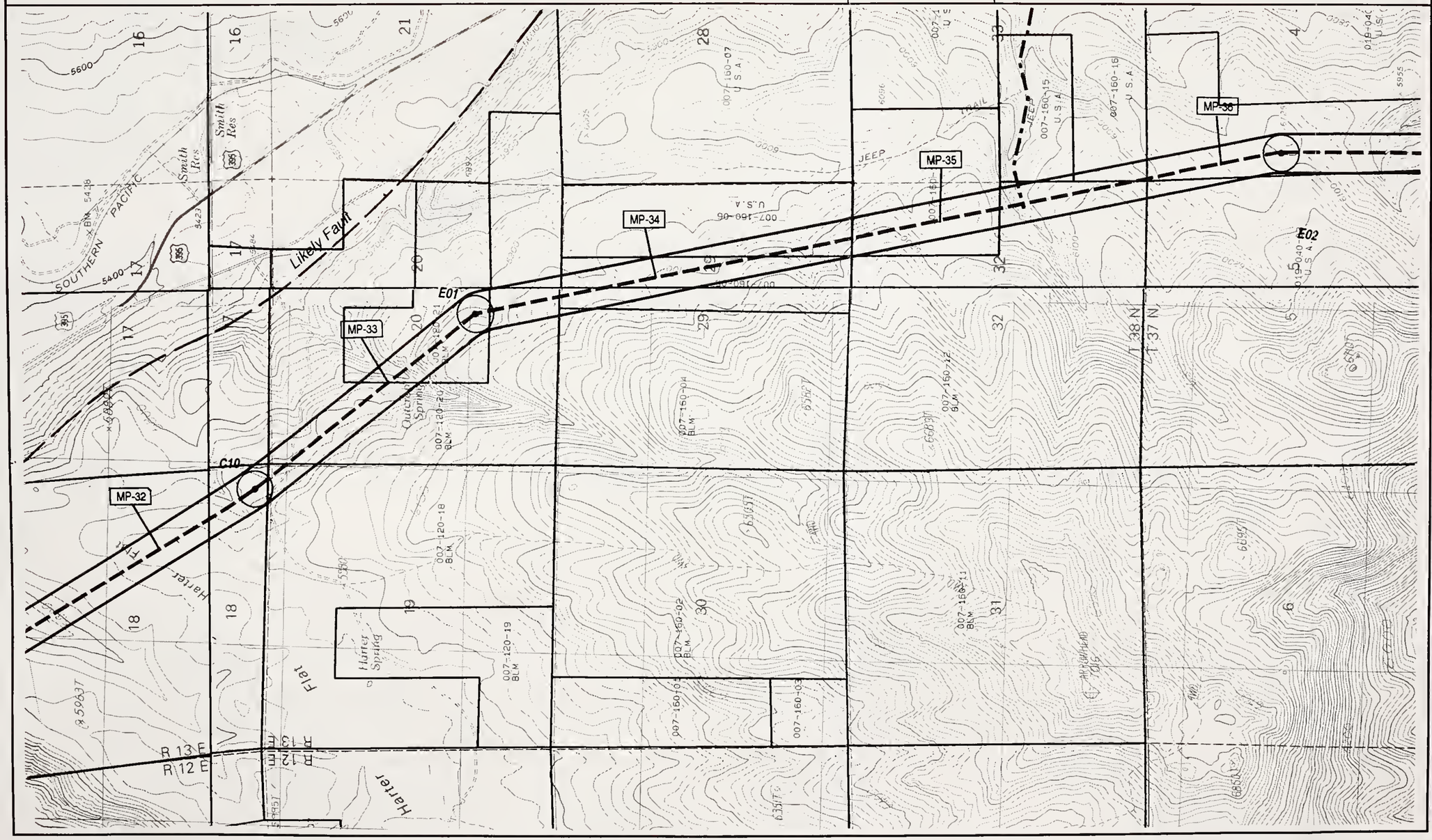
Map 6 of 33

Proposed Route

[Segment C]



East of Corridor Within Corridor West of Corridor	SENSITIVE SPECIES
East of Corridor Within Corridor West of Corridor	SENSITIVE HABITAT
East of Corridor Within Corridor West of Corridor	VEGETATION
Geologic Formation Soil Association	GEOLOGY / SOILS
Blading Tree Removal	OVERLAND TRAVEL
	JURISDICTION



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

E
N S
W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Holbrook Canyon, CA 1990; Likely, CA 1990, Madeline, CA 1975.*

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

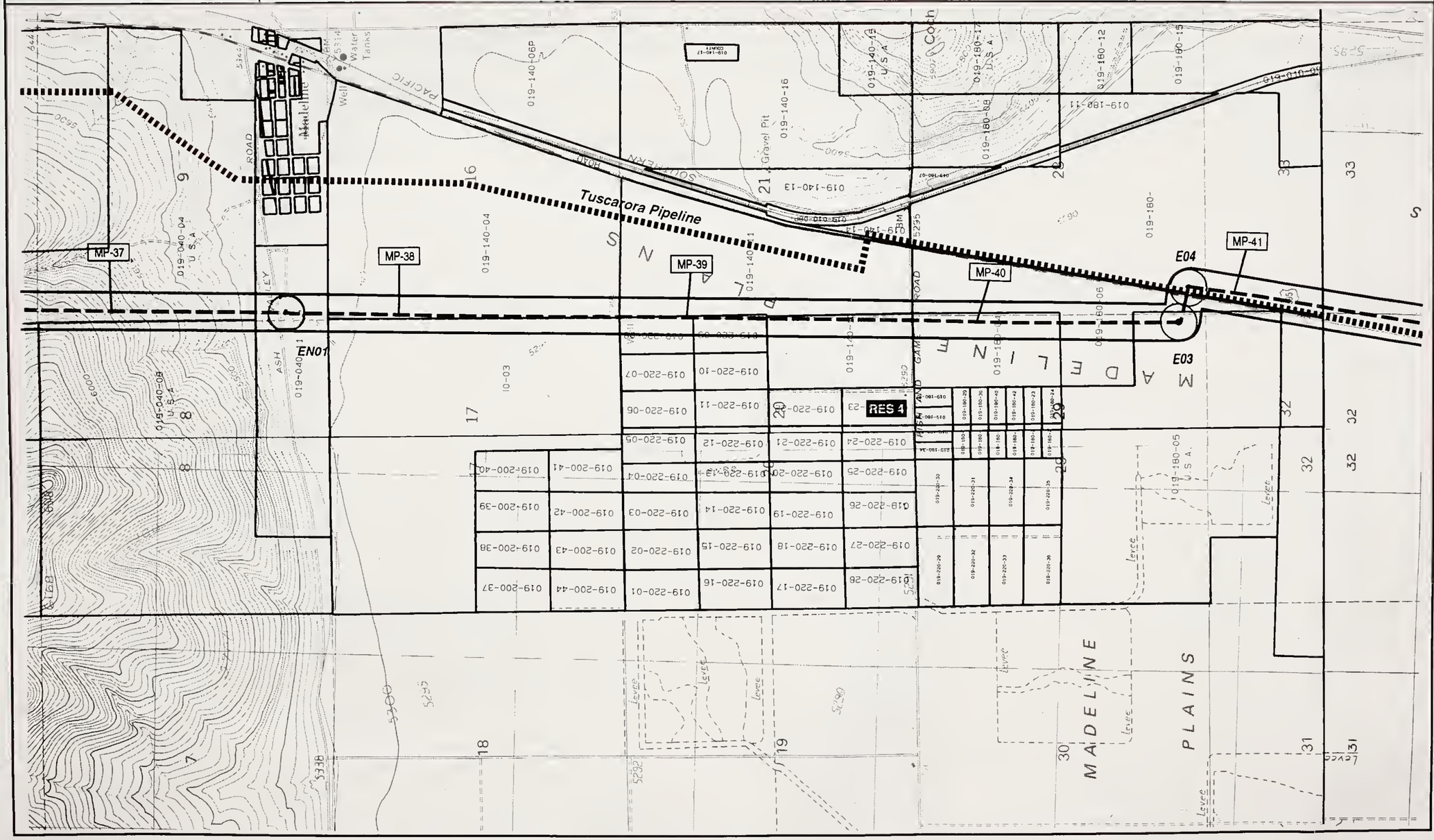
ALTURAS TRANSMISSION LINE EIR/S

Map 7 of 33

Proposed Route

[Segment C & E]

HL, RL, LL, CS	HL, RL / HL, RL	East of Corridor / Within Corridor / West of Corridor	SENSITIVE SPECIES
PRONGHORN ANTELOPE KIDDING AREA, SAGE GROUSE BROODING, MULE DEER WINTER USE		East of Corridor / Within Corridor / West of Corridor	SENSITIVE HABITAT
JUNIPER WOODLAND	DISTURBED/ CULTIVATED / SILVER SAGEBRUSH SCRUB / DISTURBED/ CULTIVATED	East of Corridor / Within Corridor / West of Corridor	VEGETATION
Pvb 182 / 429	Qi 585 / 580 / 218 / 210 / 211 / 710 / 210 / 226	Geologic Formation / Soil Association	GEOLOGY / SOILS
		Blading / Tree Removal	OVERLAND TRAVEL
USA			JURISDICTION



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

N E S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): ***Anderson Mountain, CA 1989; Holbrook Canyon, CA 1990; Madeline, CA 1975; McDonald Peak, CA 1989.***

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map 8 of 33

Proposed Route

[Segment E]

◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE SPECIES**
◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE HABITAT**
◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**VEGETATION**
◄ Geologic Formation ◄ Soil Association	**GEOLOGY / SOILS**
◄ Blading ◄ Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

PRONGHORN ANTELOPE KIDDING AREA, SAGE GROUSE BROODING, MULE DEER WINTER USE

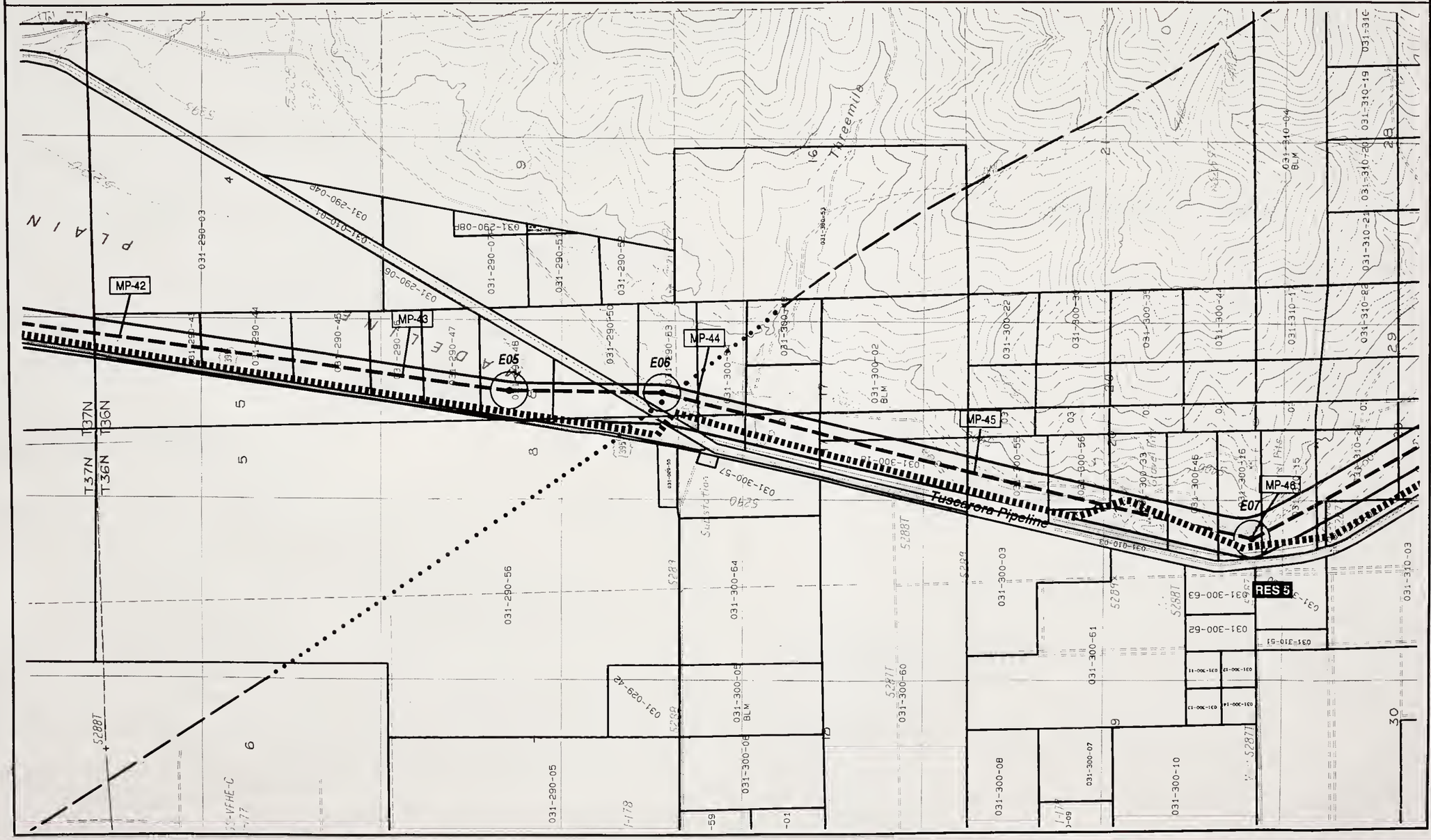
PRONGHORN SUMMER RANGE

PRONGHORN SUMMER RANGE

DISTURBED/CULTIVATED

BIG SAGEBRUSH SCRUB

Qt	Qt		Qlg		Qt		Ttwf		Qt		Qt	
226		210	710	585		210		585		430	585	710



East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

HL, RL PL | HL, RL PL | PL | VD | VD

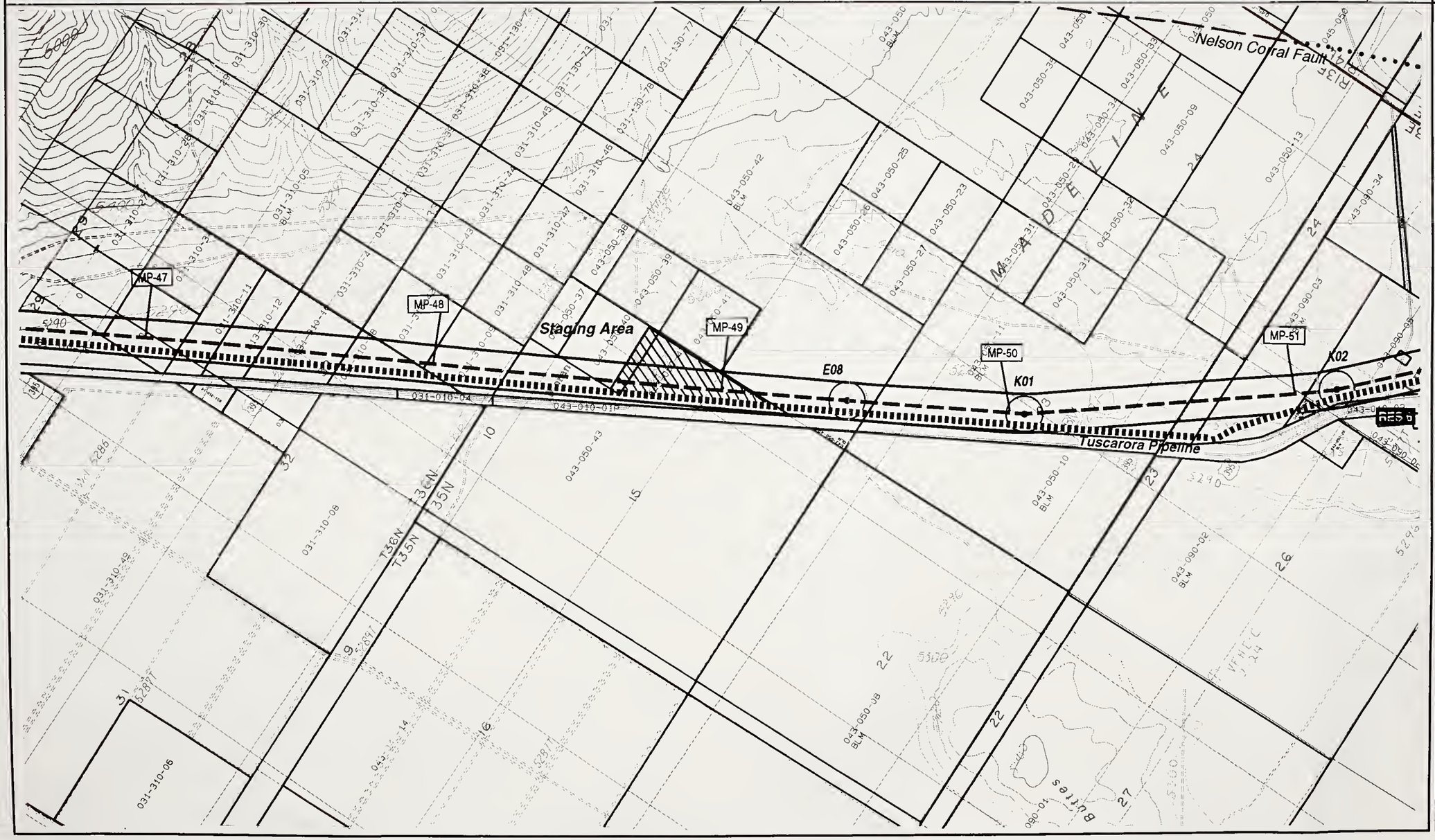
PRONGHORN SUMMER RANGE, MULE DEER MIGRATION AREA | PRONGHORN SUMMER RANGE

BIG SAGEBRUSH SCRUB | BIG SAGEBRUSH SCRUB

Qf | Qf | Qf | Qf | Tdrb | Qf

710 | 210 | 710 | 585

USA | USA | USA



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Anderson Mountain, CA 1989; Cleghorn Flat, CA 1989; McDonald Peak, CA 1989; Termo, CA 1989.*

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map 10 of 33

Proposed Route

[Segment E & K]

| | | |

East of Corridor Within Corridor West of Corridor	SENSITIVE SPECIES
East of Corridor Within Corridor West of Corridor	SENSITIVE HABITAT
East of Corridor Within Corridor West of Corridor	VEGETATION
Geologic Formation Soil Association	GEOLOGY / SOILS
Blading Tree Removal	OVERLAND TRAVEL
	JURISDICTION

PRONGHORN SUMMER RANGE

BIG SAGEBRUSH SCRUB

PRONGHORN SUMMER RANGE

BIG SAGEBRUSH SCRUB

Tfpr	Tfpr	Tfpr	Tfpr	Twra
405	210	495	588	495	304

BLM

BLM

KEY

Alturas Transmission Line Proposed Route

Angle Point

MP-50 Proposed Route Mile Marker

E N S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Ravendale, CA 1989; Snowstorm Mountain, CA 1989; Snowstorm Mountain West, CA 1989; Termo, CA 1989.*

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map 12 of 33

Proposed Route

[Segment K]

HM	SENSITIVE SPECIES
	SENSITIVE HABITAT
BIG SAGEBRUSH SCRUB / LOW SAGEBRUSH SCRUB / JUNIPER WOODLAND	VEGETATION
Twra 304 / Tppl 495 / Tbsu 118 / 122 / 118 / Tbsu 118 / 122 / 118 / Tbsu 122	GEOLOGY / SOILS
	OVERLAND TRAVEL
BLM / BLM / BLM	JURISDICTION

East of Corridor
Within Corridor
West of Corridor

Geologic Formation
Soil Association

Blading
Tree Removal

KEY

Alturas Transmission Line Proposed Route

Angle Point

MP-50 Proposed Route Mile Marker

N E S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s):
Snowstorm Mountain, CA 1989;
Snowstorm Mountain West, CA 1989.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

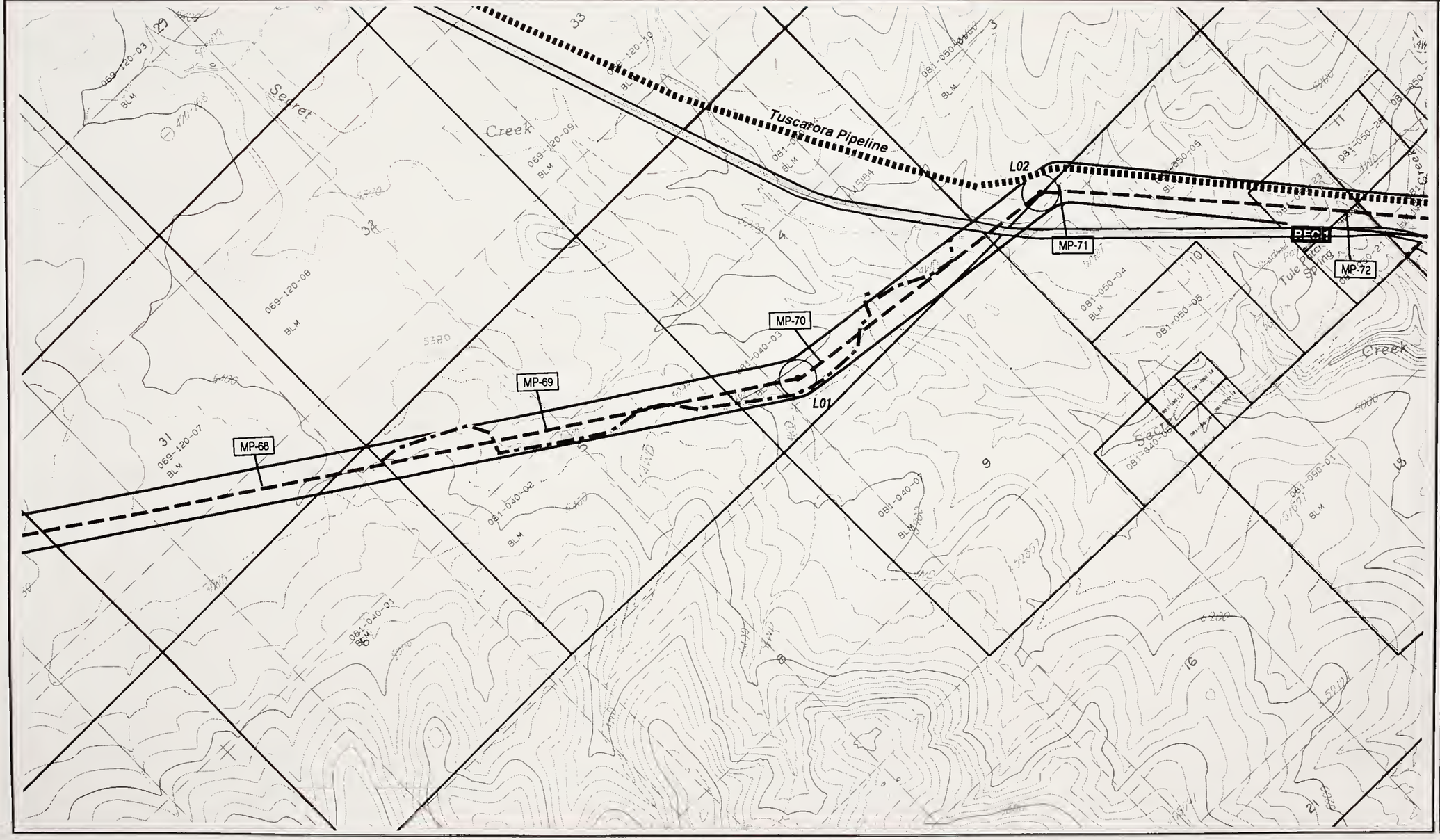
ALTURAS TRANSMISSION LINE EIR/S

Map 13 of 33

Proposed Route

[Segment K & L]

HM, HM, HM, SMV, SMV, PCEP, RL,SMV,HM, SMV, SMV, SMV, SMV, SMV	East of Corridor / Within Corridor / West of Corridor — **SENSITIVE SPECIES**
PRONGHORN SUMMER RANGE; MULE DEER WINTERING AREA; MULE DEER MIGRATION CORRIDOR; RIPARIAN/ WETLANDS	East of Corridor / Within Corridor / West of Corridor — **SENSITIVE HABITAT**
JUNIPER WOODLAND	East of Corridor / Within Corridor / West of Corridor — **VEGETATION**
Tbsu: 122, 118; Tsl: 405, 464, 413; Tsbl: 421, 118; Tms: 413; Tms: 413	Geologic Formation / Soil Association — **GEOLOGY / SOILS**
	Blading / Tree Removal — **OVERLAND TRAVEL**
BLM, BLM, BLM, BLM, BLM	**JURISDICTION**



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

N W E S

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Five Springs, CA 1989; Karlo, CA 1989; Snowstorm Mountain, CA 1989; Snowstorm Mountain West, CA 1989.*

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

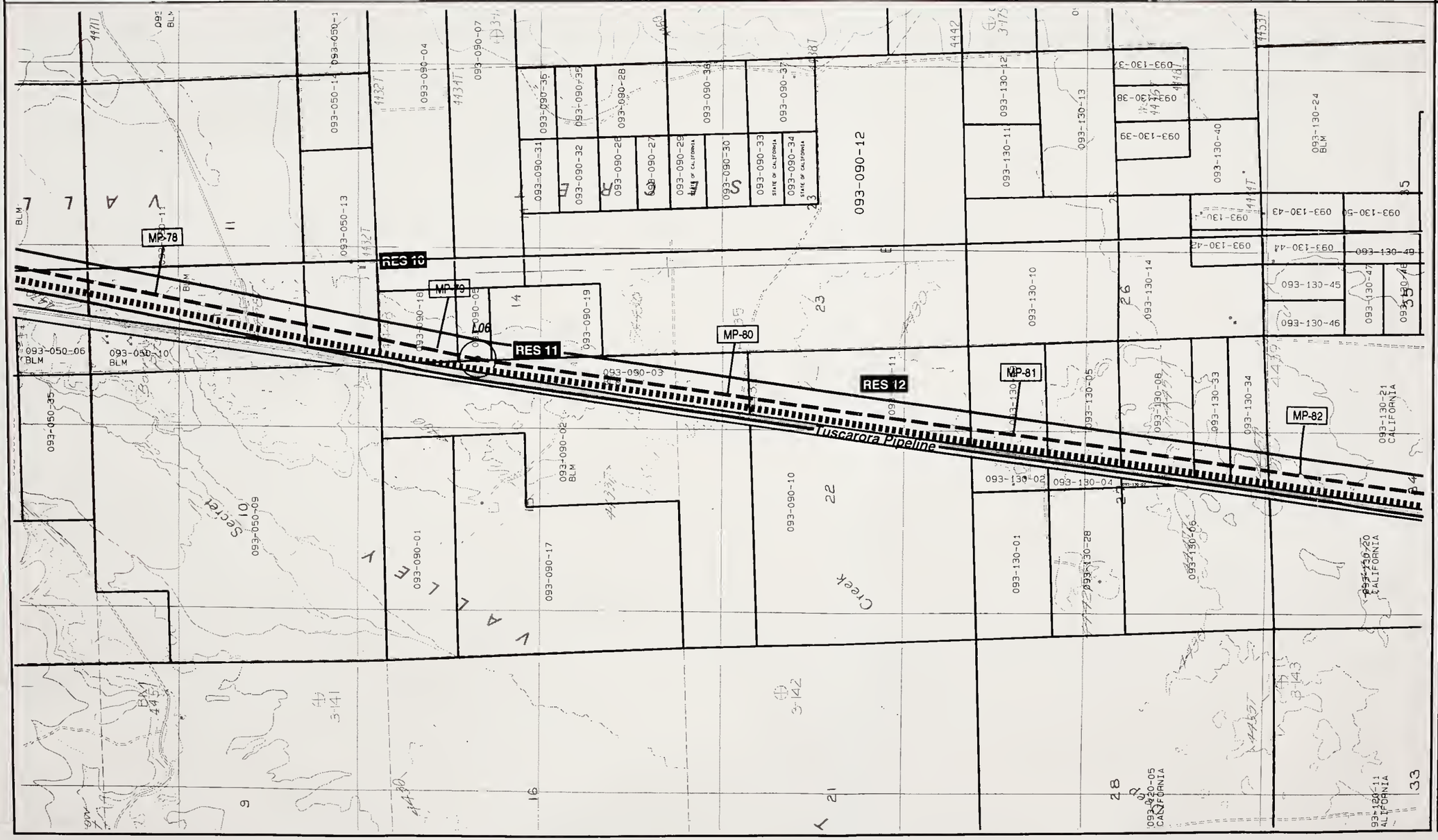
Map 14 of 33

Proposed Route

[Segment L]

| | | |

FS DL — GPP — GPP — GPP		◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE SPECIES**
SAGE GROUSE-SUMMER RANGE — SAGE GROUSE SUMMER RANGE		◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE HABITAT**
BIG SAGEBRUSH SCRUB — CHENOPOD SCRUB		◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**VEGETATION**
Tlrl: 266, 850, 266, 152, 266 — Tlrl — Qs: 208 — Tlrl: 116 — Qs		◄ Geologic Formation ◄ Soil Association	**GEOLOGY / SOILS**
		◄ Blading ◄ Tree Removal	**OVERLAND TRAVEL**
BLM	STATE LANDS COMMISSION		**JURISDICTION**



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

E / N / S / W

0 — 2000 — 4000
Scale in Feet

0 — 1/2 — 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): ***Five Springs, CA 1989; Karlo, CA 1989.***

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

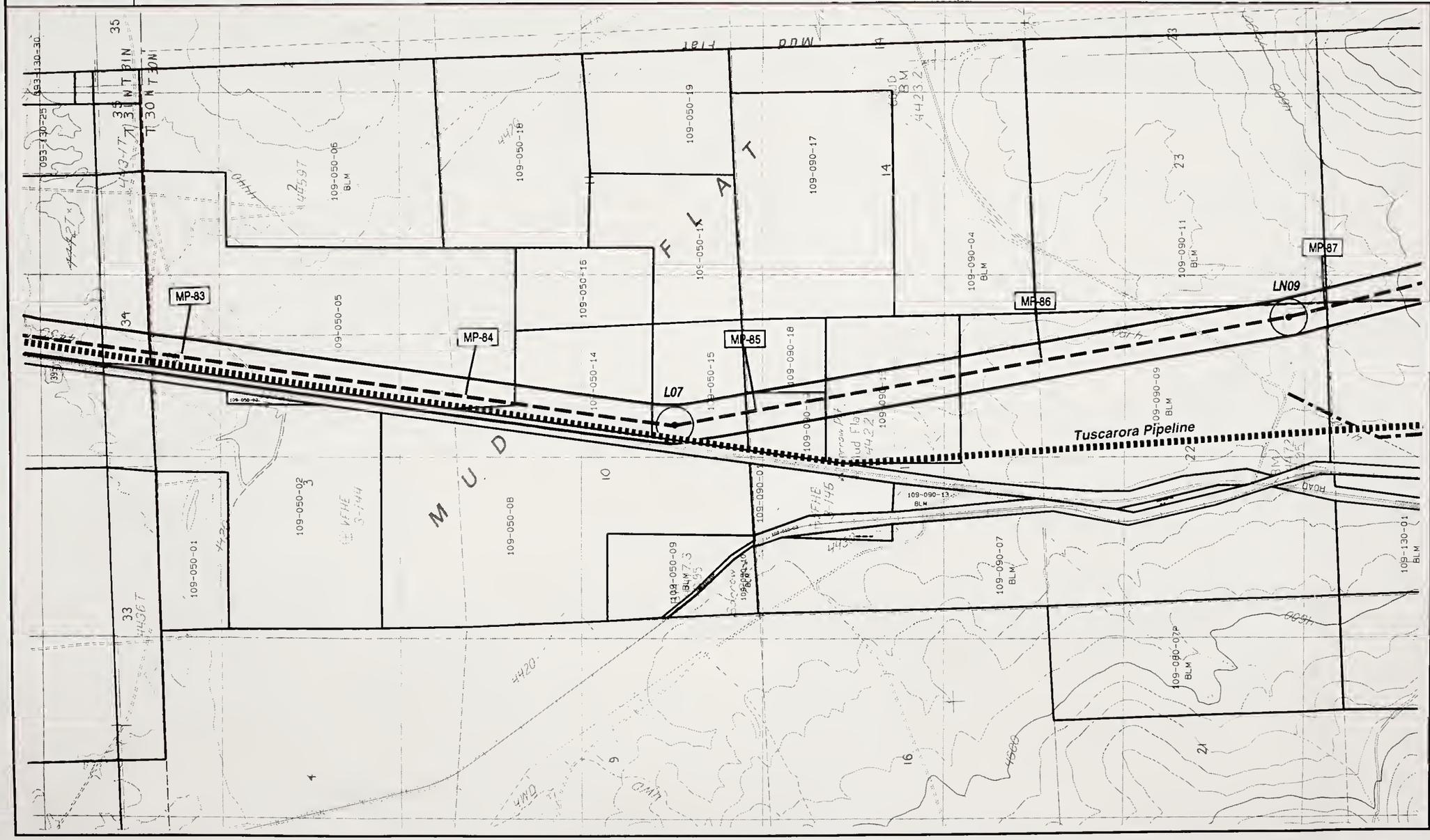
ALTURAS TRANSMISSION LINE EIR/S

Map 16 of 33

Proposed Route

[Segment L]

SM					SM		East of Corridor Within Corridor West of Corridor	SENSITIVE SPECIES
PRONGHORN ANTELOPE KIDDING & YEAR LONG USE AREA							East of Corridor Within Corridor West of Corridor	SENSITIVE HABITAT
CHENOPOD SCRUB	MUD FLAT	LOW SAGEBRUSH SCRUB					East of Corridor Within Corridor West of Corridor	VEGETATION
Qs	Tlrt	Qhl	Tlrt	Tvb		Tvsa	Geologic Formation	GEOLOGY / SOILS
116	144	205	210	185	135	177	186	Soil Association
							Blading Tree Removal	OVERLAND TRAVEL
S.L.C.			BLM			BLM		JURISDICTION



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

E
N S
W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s):
Five Springs, CA 1989; Karlo, CA 1989,
Little Mud Flat, CA 1988;
Shaffer Mountain, CA 1988.

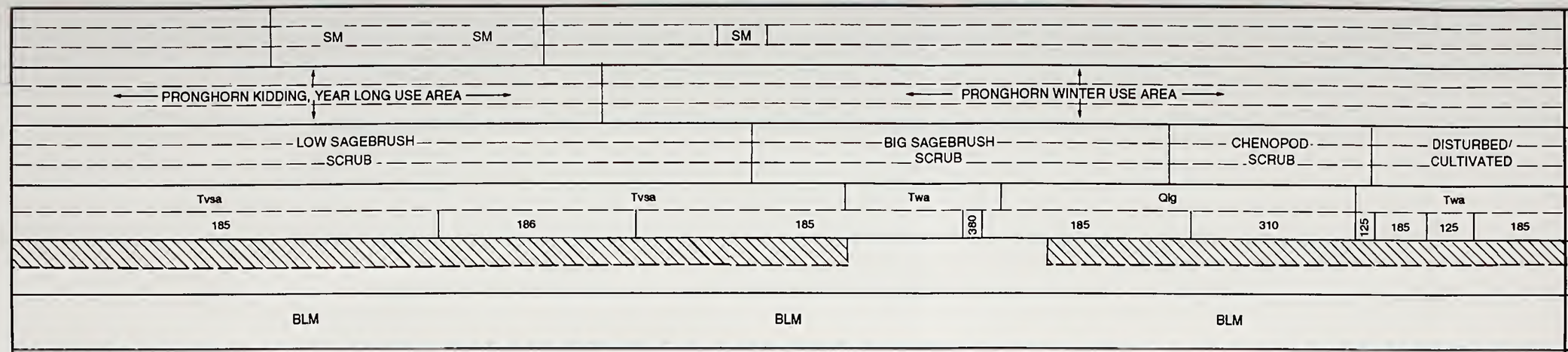
NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

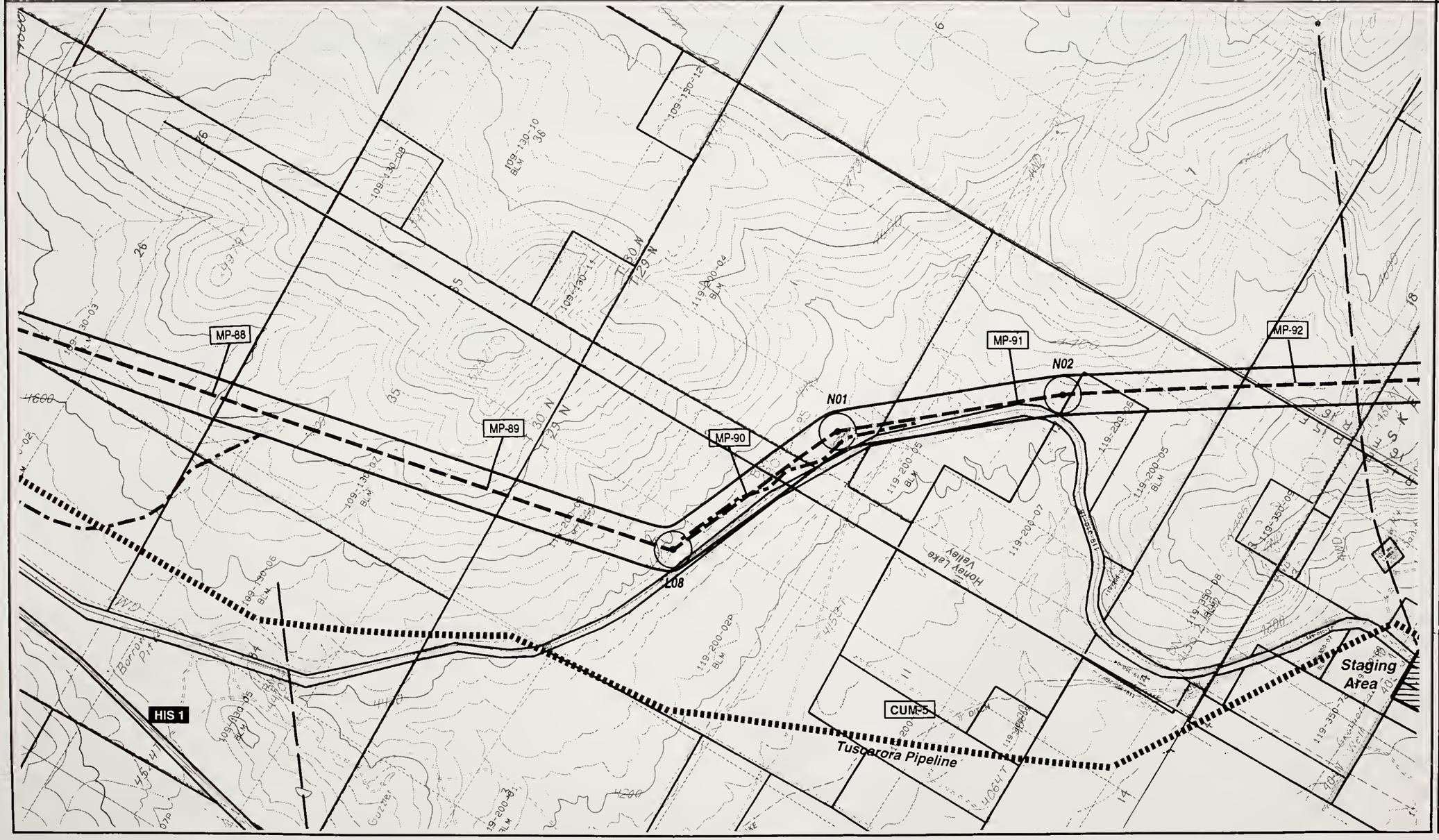
Map 17 of 33

Proposed Route

[Segment L]



East of Corridor Within Corridor West of Corridor	SENSITIVE SPECIES
East of Corridor Within Corridor West of Corridor	SENSITIVE HABITAT
East of Corridor Within Corridor West of Corridor	VEGETATION
Geologic Formation Soil Association	GEOLOGY / SOILS
Blading Tree Removal	OVERLAND TRAVEL
	JURISDICTION



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

N W E S

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Little Mud Flat, CA 1988; Shaffer Mountain, CA 1988; Wendel, CA 1988; Wendel Hot Springs, CA 1988;*

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map 18 of 33

Proposed Route

[Segment L & N]

| | | |

◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE SPECIES**
◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE HABITAT**
◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**VEGETATION**
◄ Geologic Formation ◄ Soil Association	**GEOLOGY / SOILS**
◄ Blading ◄ Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

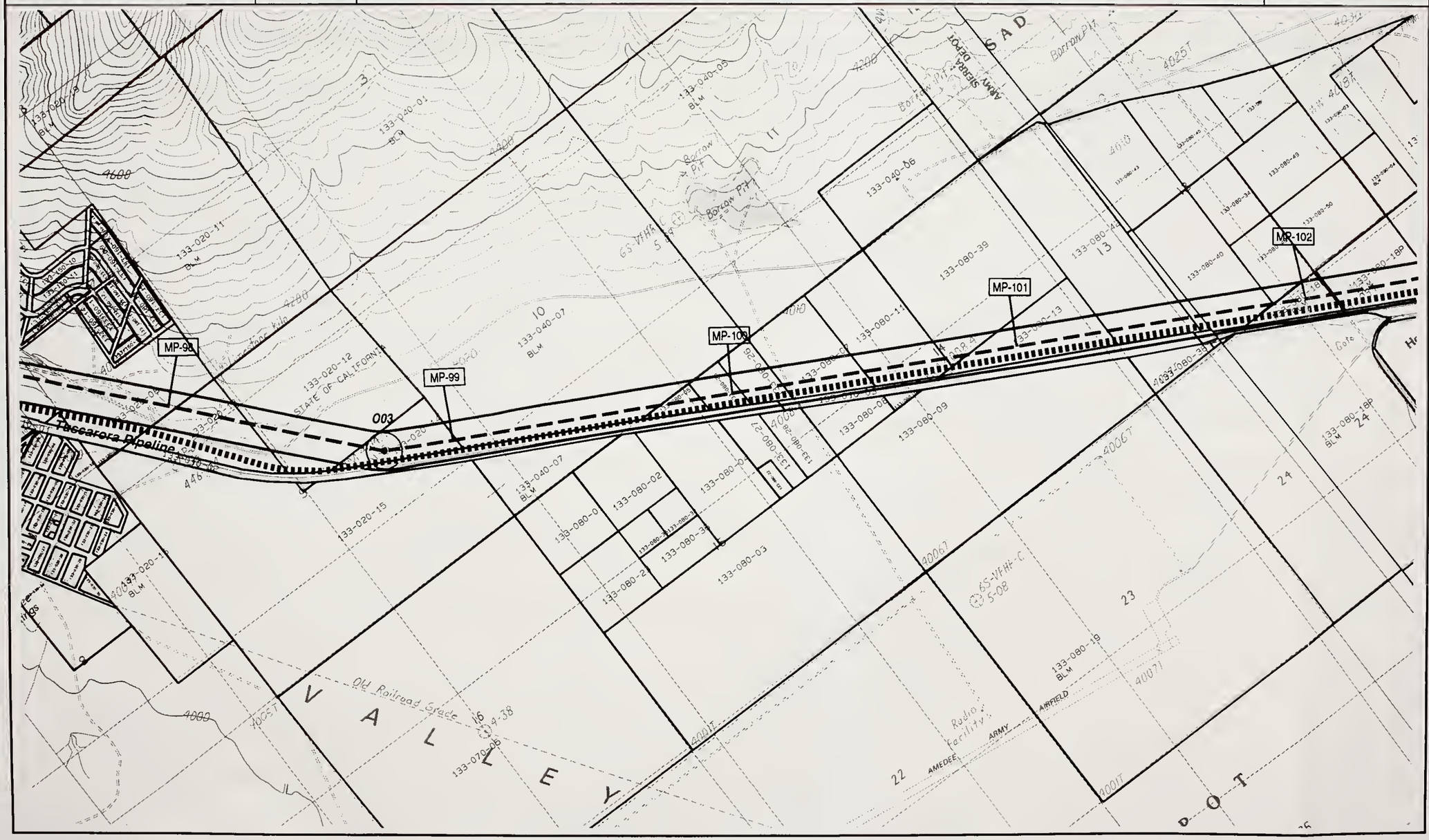
CHENOPOD SCRUB

CHENOPOD SCRUB

Qf	Qf	Qf	Qfe	Qfe	Qfe
360	380	360 361	360	325	330

STATE OF CALIFORNIA

BLM



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

N E S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): ***Spencer Creek, CA 1988; Wendel, CA 1988.***

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

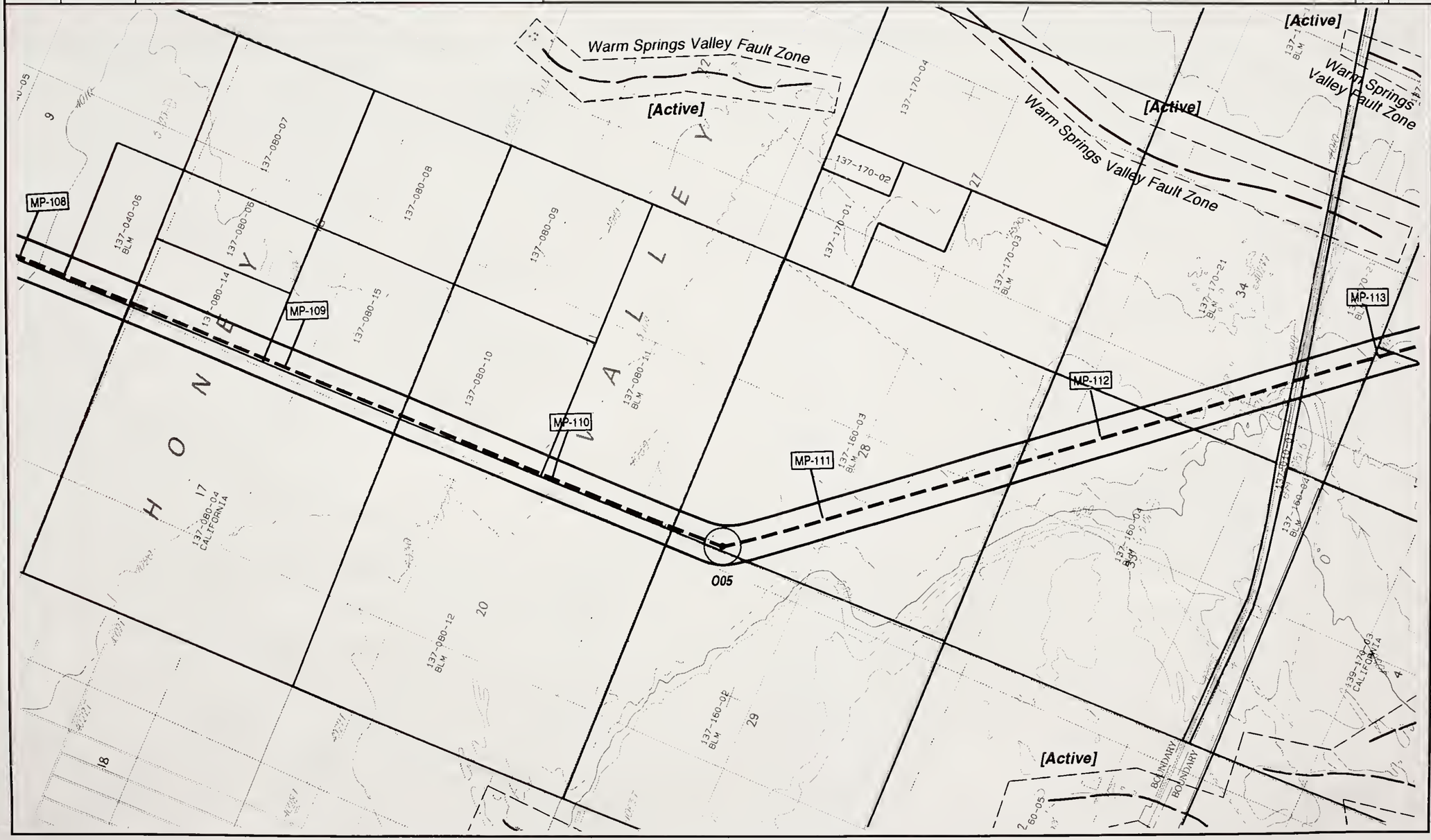
Map 20 of 33

Proposed Route

[Segment O]

	◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE SPECIES**
	◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE HABITAT**
CHENOPOD SCRUB / BIG SAGEBRUSH SCRUB	◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**VEGETATION**
Qle 330 / Qle 340 / 370 / 116 / 370 / 341 / Qle 345 / 330 / Qle 336 / 370 / 336 / 345 / Qle 336 / 325	◄ Geologic Formation ◄ Soil Association	**GEOLOGY / SOILS**
	◄ Blading ◄ Tree Removal	**OVERLAND TRAVEL**
BLM		**JURISDICTION**

LLSP	East of Corridor / Within Corridor / West of Corridor — **SENSITIVE SPECIES**
	East of Corridor / Within Corridor / West of Corridor — **SENSITIVE HABITAT**
BIG SAGEBRUSH SCRUB; STABILIZED/PARTIALLY STABILIZED DUNES; BIG SAGEBRUSH SCRUB	East of Corridor / Within Corridor / West of Corridor — **VEGETATION**
Qle 325; Qle 372; Qle 345; Qle 365; Qle 358; Qle 365; Qle 358; Qle 365; Qd 314; Qle 365; Qle 345; Qle 369	Geologic Formation / Soil Association — **GEOLOGY / SOILS**
	Blading / Tree Removal — **OVERLAND TRAVEL**
BLM; BLM; BLM; BLM	**JURISDICTION**



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

N E S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): ***Calneva Lake, CA 1988.***

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

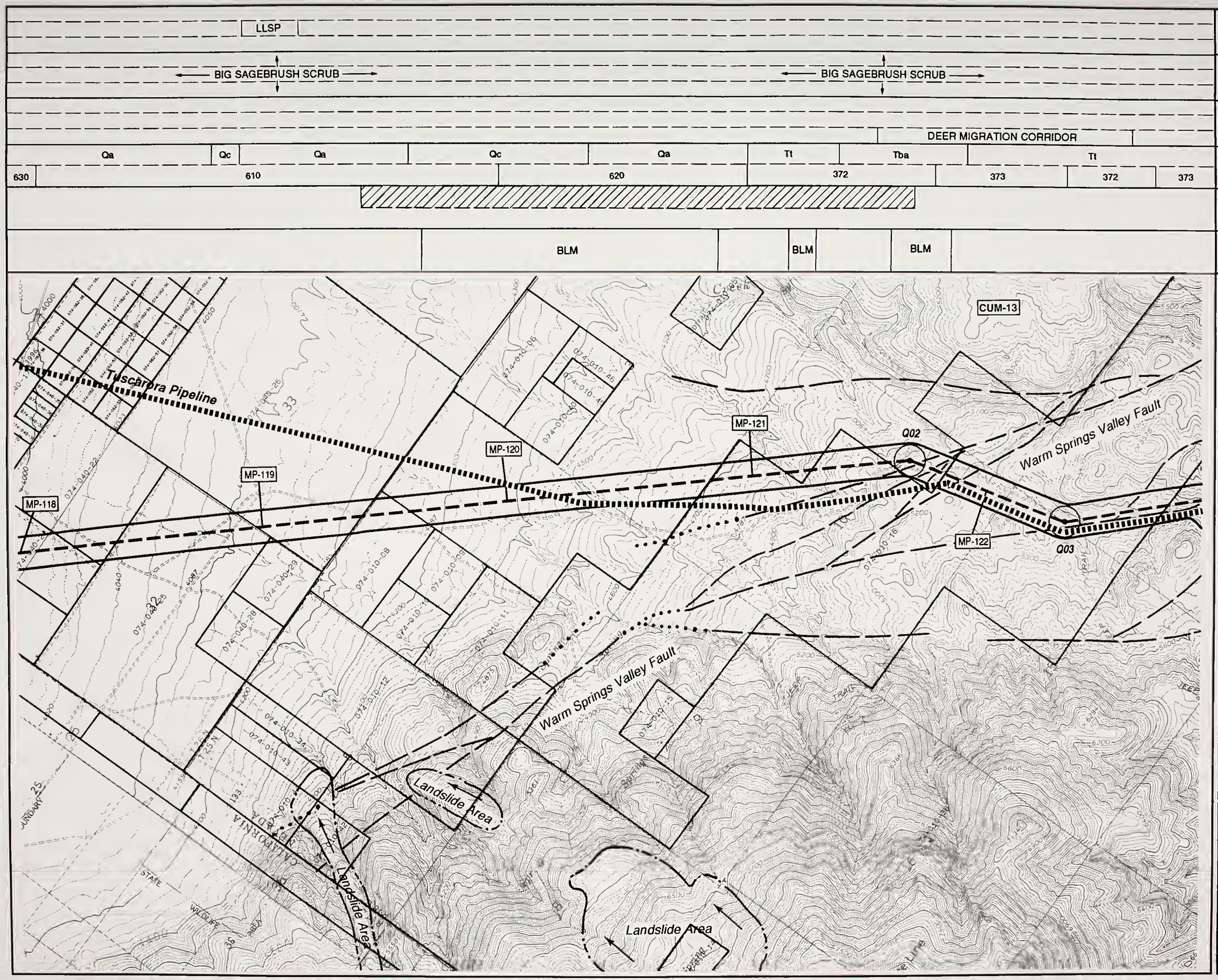
ALTURAS TRANSMISSION LINE EIR/S

Map 22 of 33

Proposed Route

[Segment O]

| | | |



East of Corridor Within Corridor West of Corridor	SENSITIVE SPECIES
East of Corridor Within Corridor West of Corridor	SENSITIVE HABITAT
East of Corridor Within Corridor West of Corridor	VEGETATION
Geologic Formation Soil Association	GEOLOGY / SOILS
Blading Tree Removal	OVERLAND TRAVEL
	JURISDICTION

KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): ***Doyle, CA 1988; Stateline Peak, NV 1981.***

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map 24 of 33

Proposed Route

[Segment Q]

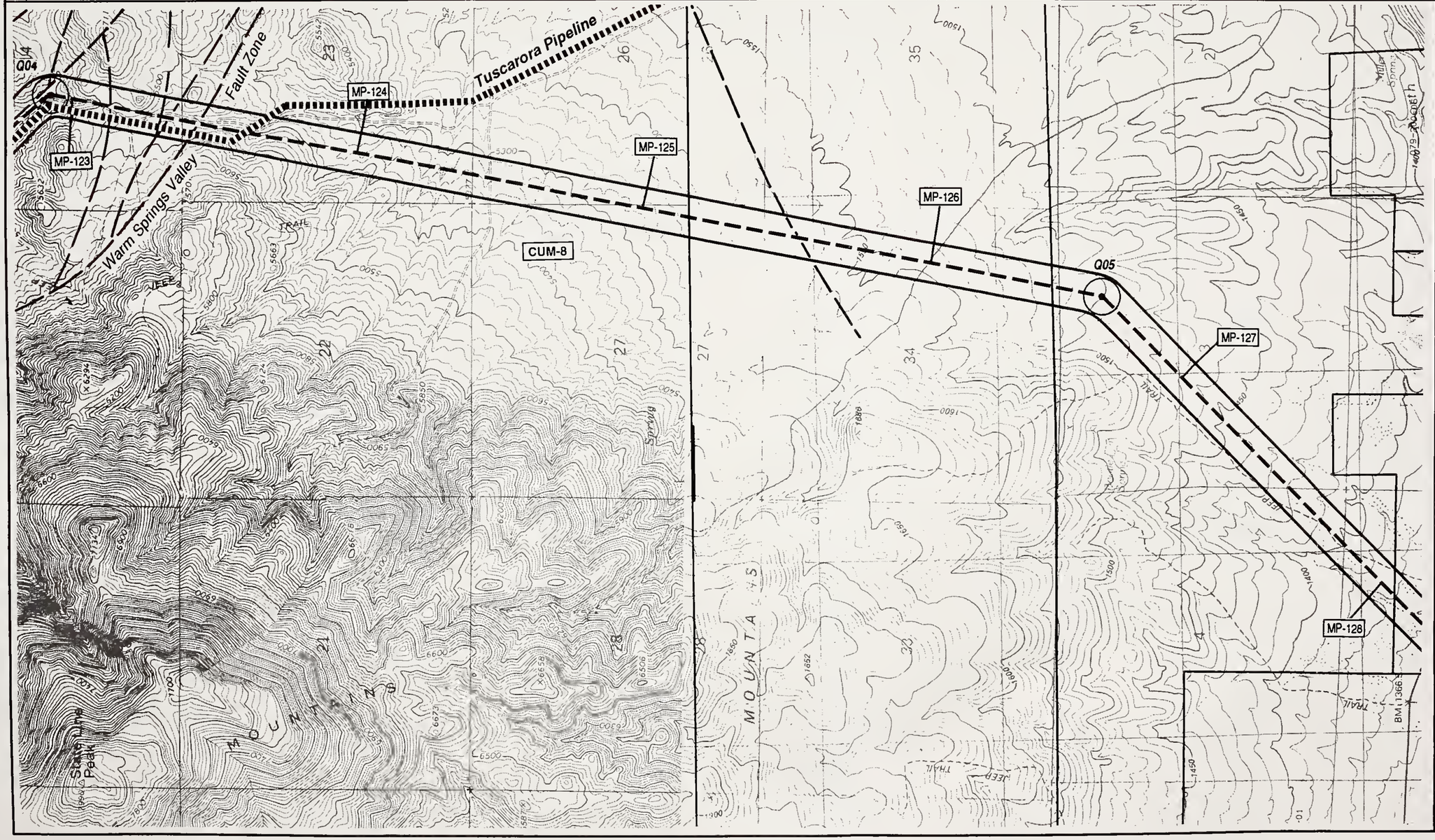
East of Corridor Within Corridor West of Corridor	SENSITIVE SPECIES
East of Corridor Within Corridor West of Corridor	SENSITIVE HABITAT
East of Corridor Within Corridor West of Corridor	VEGETATION
Geologic Formation Soil Association	GEOLOGY / SOILS
Blading Tree Removal	OVERLAND TRAVEL
	JURISDICTION

BIG SAGEBRUSH SCRUB | JUNIPER WOODLAND | JUNIPER WOODLAND

Tt | Twt | Tt | Ttb | Tt | Twt | Tt | Ttb | Tt | Twt | Qa | Qa | Qa | Tsv | Qa

373 | 790 | 676 | 585 | 674 | 176

BLM | BLM | BLM | BLM



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

E N S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Constantia, CA 1977; Dogskin Mountain, NV 1979; Stateline Peak, NV 1981.*

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map 25 of 33

Proposed Route
[Segment Q]

| | | |

East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

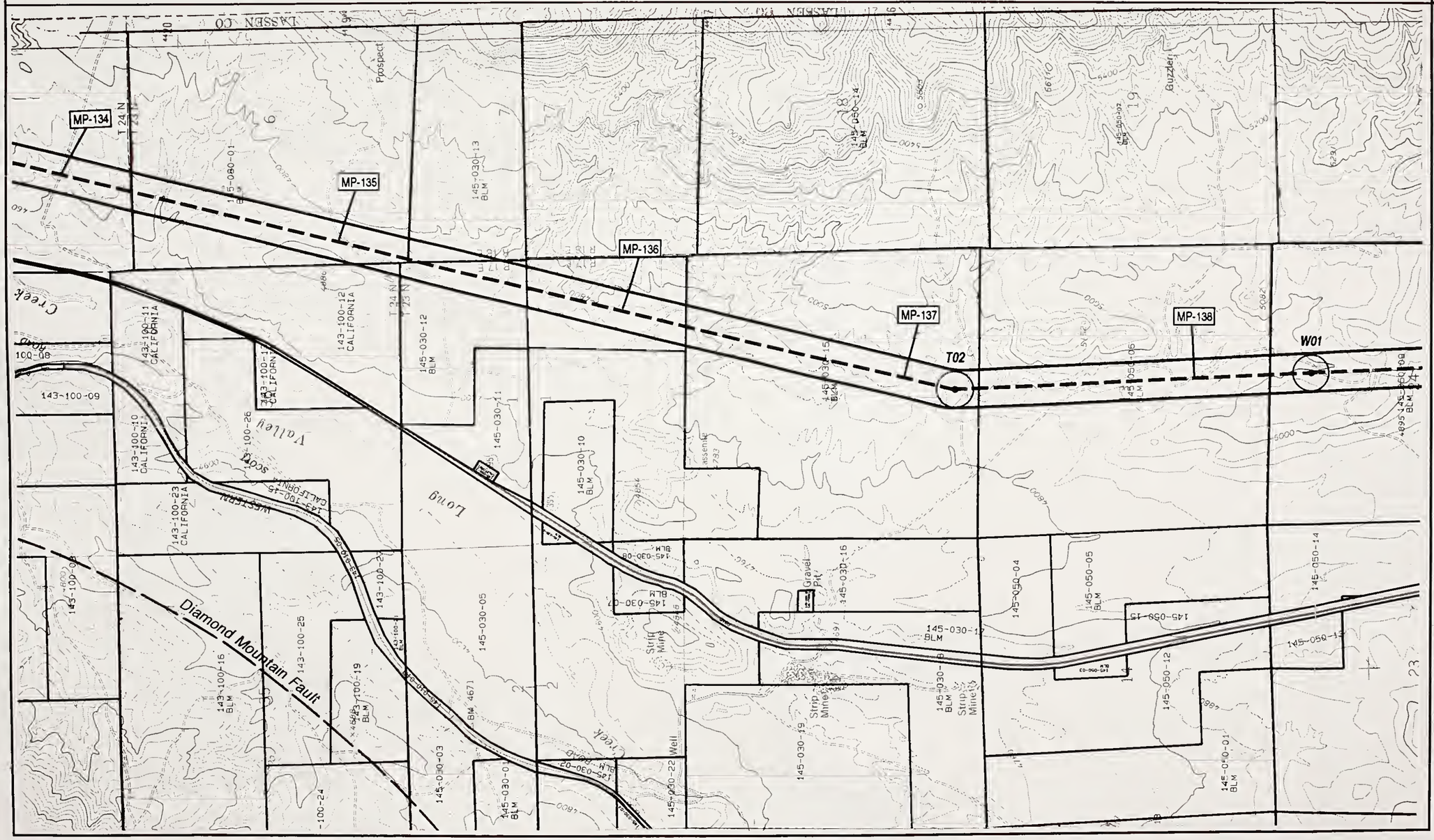
WETLAND

BIG SAGEBRUSH SCRUB

BIG SAGEBRUSH SCRUB

Th_1	Th_2		Oc	Th_2	Qc	Th_2		bb	Th_2				
682	597	682	597	688	597	682	595	682	595	682	595	872	597	984	983	597	983

BLM BLM BLM BLM



KEY

Alturas Transmission Line Proposed Route

Angle Point

MP-50 Proposed Route Mile Marker

E
N S
W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Beckwourth Pass, CA 1975; Constantia, CA 1977.*

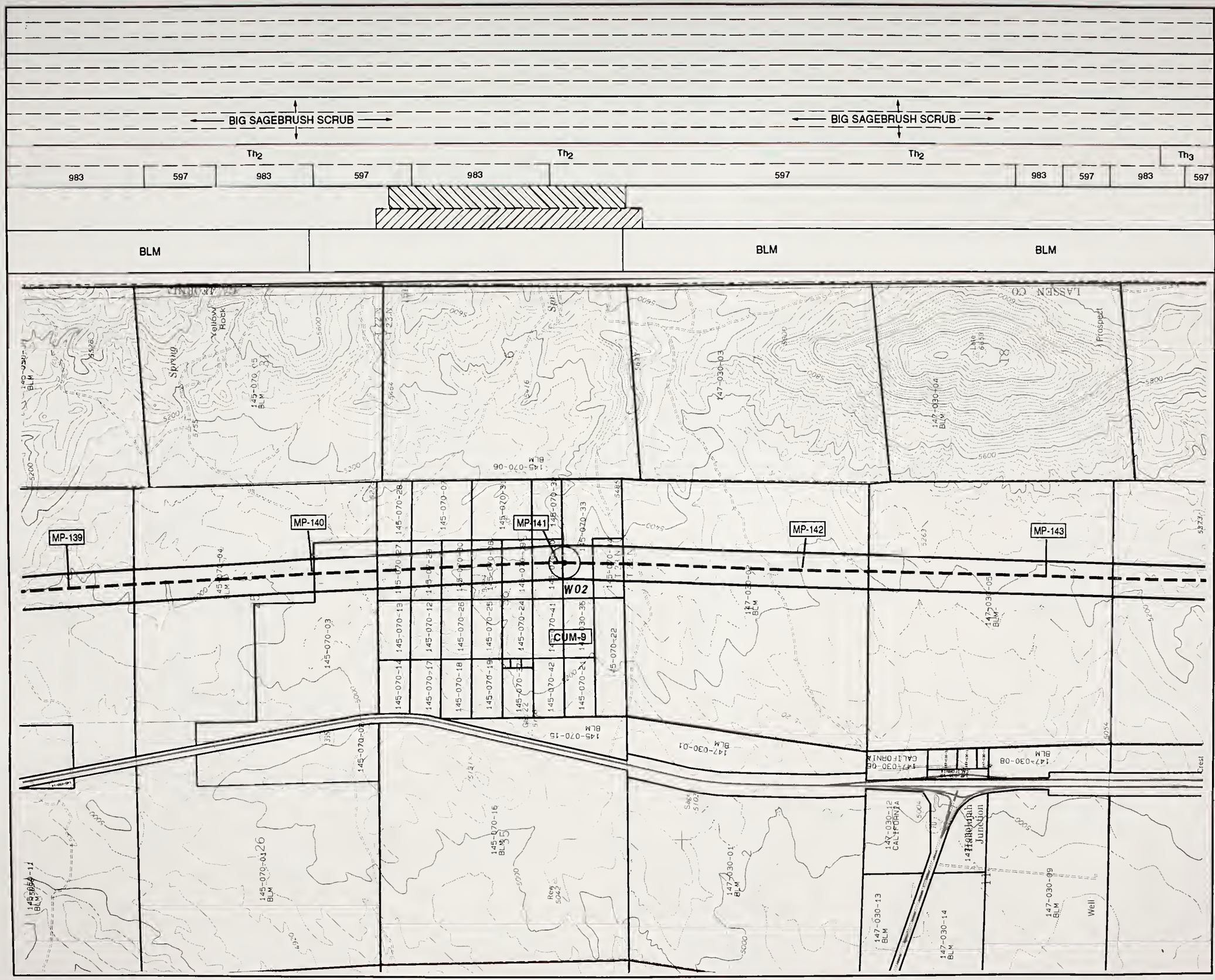
NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map 27 of 33

Proposed Route

[Segment T & W]



KEY

Alturas Transmission Line Proposed Route

Angle Point

MP-50 Proposed Route Mile Marker

E
N S
W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Beckwourth Pass, CA 1975.*

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map 28 of 33

Proposed Route

[Segment W]

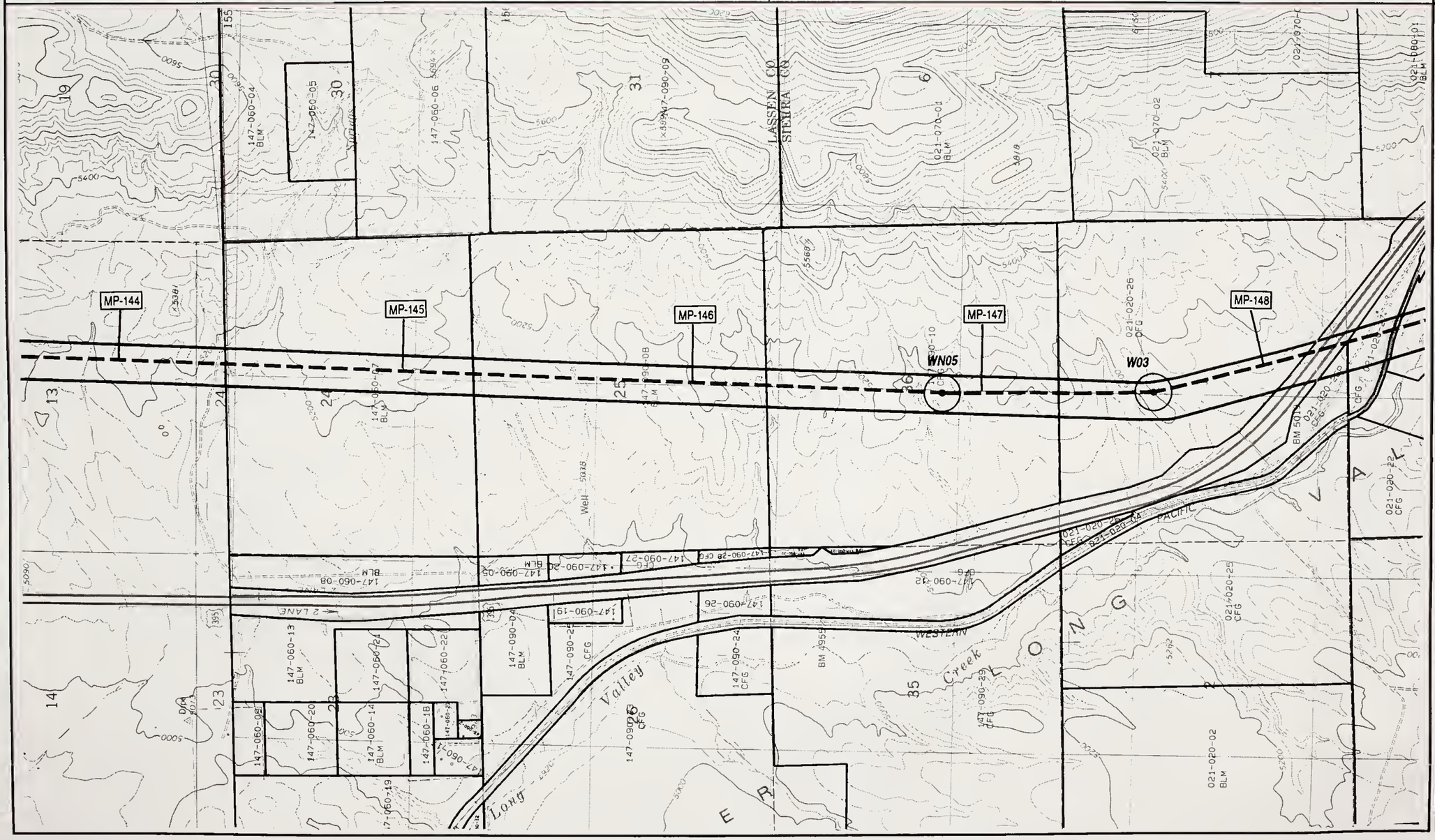
East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

BIG SAGEBRUSH SCRUB | BIG SAGEBRUSH SCRUB | SAGEBRUSH/BITTERBRUSH SCRUB | RABBITBRUSH/MONTANE MEADOW

Thu | Thu | Thu | Qa

597 | 983 | 597 | 983 | 597 | 984 | 597 | 983 | 587 | 984 | 597 | 983 | 984 | 597 | 984 | 597 | 985

BLM | BLM | BLM | CDFG | CDFG



KEY

Alturas Transmission Line Proposed Route

Angle Point

MP-50 Proposed Route Mile Marker

E
N S
W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s):
Beckwourth Pass, CA 1975;
Evans Canyon, CA-NV 1978.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

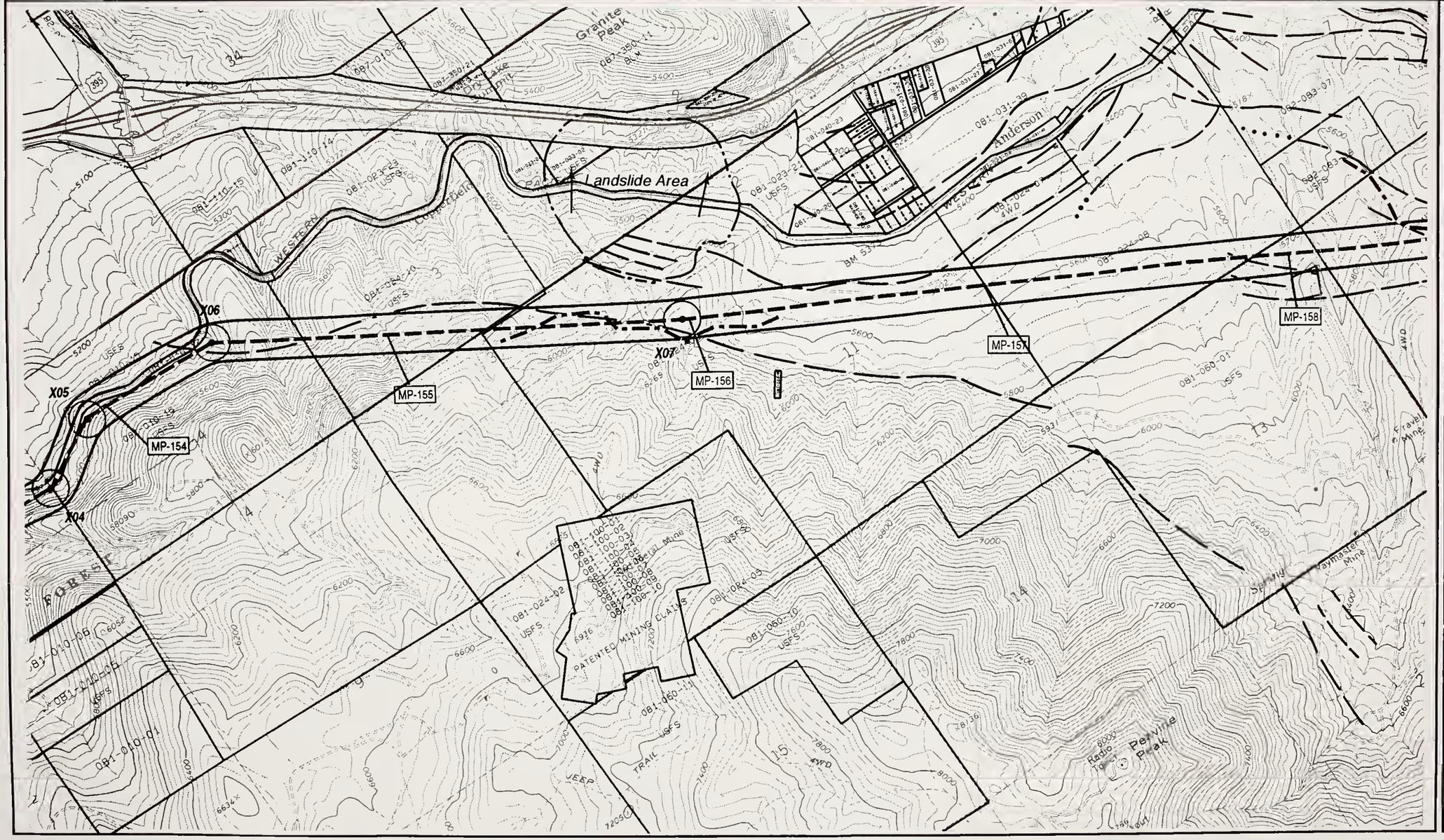
Map 29 of 33

Proposed Route

[Segment W]

| | | |

	East of Corridor Within Corridor West of Corridor	SENSITIVE SPECIES
STREAM	East of Corridor Within Corridor West of Corridor	SENSITIVE HABITAT
SAGEBRUSH/BITTERBRUSH SCRUB; BIG SAGEBRUSH SCRUB; BIG SAGEBRUSH SCRUB	East of Corridor Within Corridor West of Corridor	VEGETATION
Mzvs 662 514 930 664; Ts 930 663 982 251; Mzvl 982 252; Qpf 982 891; Ts 482; Qpf 663; Qfy 182 251 482; Qfo 664 370; Qfo 664 251; Qpf 890 252 890 252 890; Mzp	Geologic Formation Soil Association	GEOLOGY / SOILS
	Blading Tree Removal	OVERLAND TRAVEL
BLM		JURISDICTION



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker

N W E S

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Reno NW, NV 1982; Verdi, NV, 1982.*

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map 31 of 33

Proposed Route

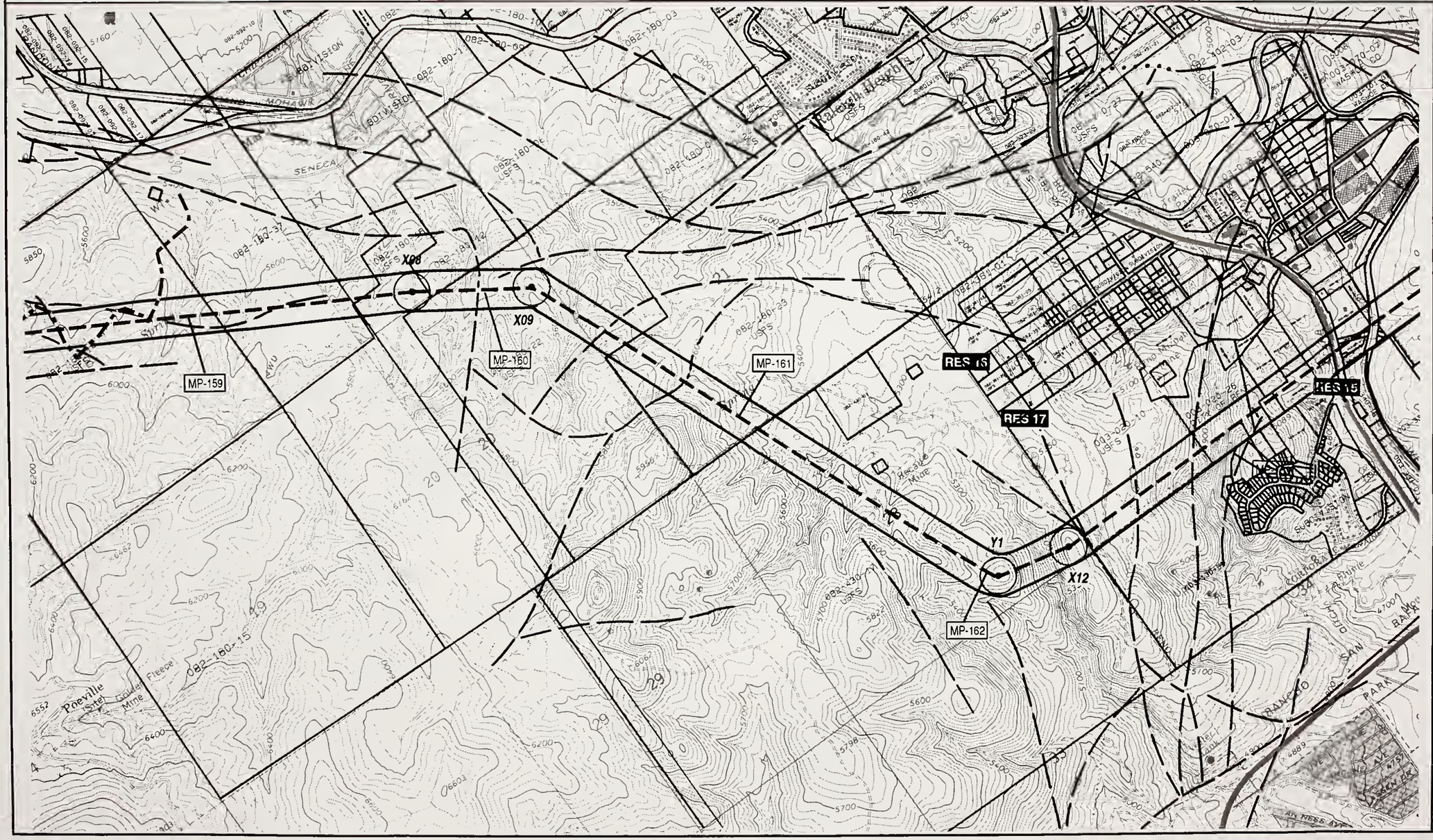
[Segment X]

AAB	SENSITIVE SPECIES
STREAM	SENSITIVE HABITAT
BIG SAGEBRUSH SCRUB; ALTERED ANDESITE; BIG SAGEBRUSH SCRUB; ALTERED ANDESITE; BIG SAGEBRUSH SCRUB; DISTURBED	VEGETATION
Mzp, Qol, Mzp, Mzgd, Mzv, Qa, Ta, Ta, Ta	GEOLOGY / SOILS
890, 901, 890, 282, 901, 281, 900, 880, 281, 880, 281, 280, 281, 900, 880, 900, 231, 882, 880, 900, 901, 190, 311, 871, 881, 880, 991, 280	GEOLOGY / SOILS
	OVERLAND TRAVEL
BLM; BLM; BLM; BLM; CITY OF RENO	JURISDICTION

◄ East of Corridor
◄ Within Corridor
◄ West of Corridor

◄ Geologic Formation
◄ Soil Association

◄ Blading
◄ Tree Removal



KEY

Alturas Transmission Line Proposed Route

Angle Point

MP-50 Proposed Route Mile Marker

N E W S

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Reno, NV 1982; Verdi, NV, 1982.*

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

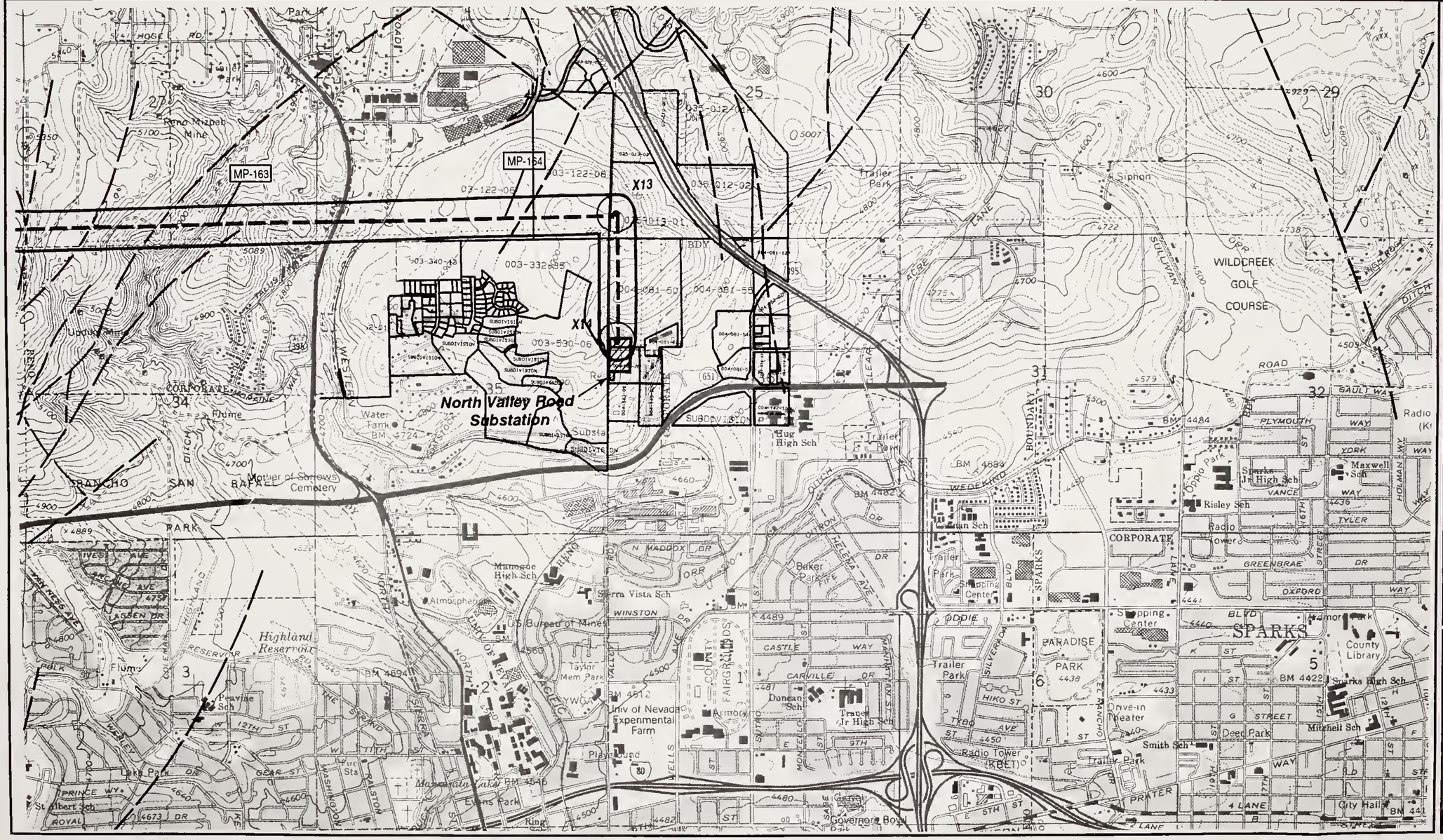
ALTURAS TRANSMISSION LINE EIR/S

Map 32 of 33

Proposed Route

[Segment X & Y]

				◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	SENSITIVE SPECIES
				◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	SENSITIVE HABITAT
	BIG SAGEBRUSH SCRUB			◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	VEGETATION
Ta	Ta		Ta	◄ Geologic Formation ◄ Soil Association	GEOLOGY / SOILS
See Sheet 32	191	190	310	◄ Blading ◄ Tree Removal	OVERLAND TRAVEL
					JURISDICTION



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 Proposed Route Mile Marker

BASEMAP: USGS 7.5 Minute Quadrangle(s): ***Reno NW, 1982.***

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map 33 of 33

Proposed Route

[Segment X]

DOU

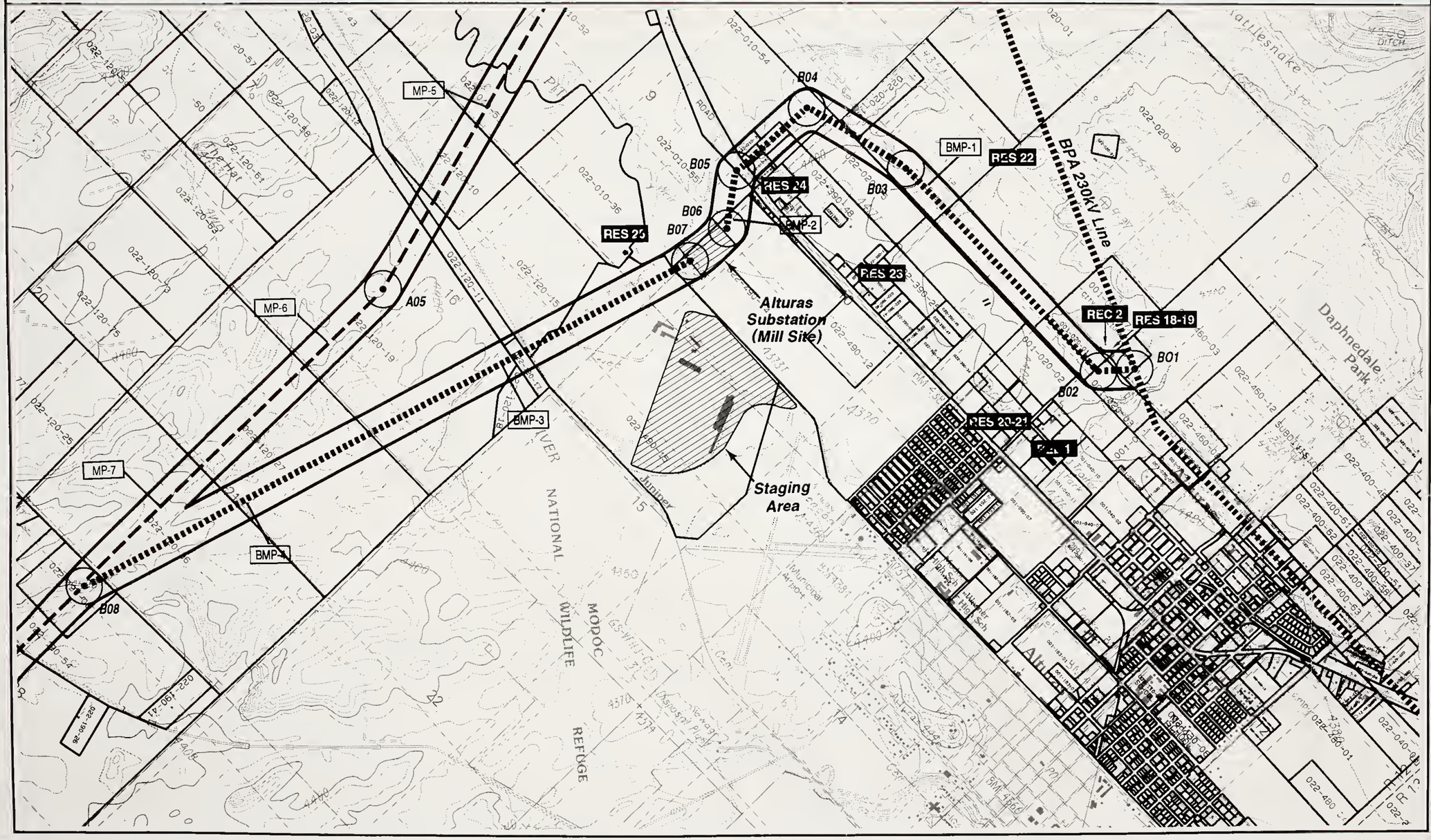
WETLANDS

BIG SAGEBRUSH SCRUB

MONTANE MEADOW

DISTURBED/ CULTIVATED

East of Corridor Within Corridor West of Corridor	SENSITIVE SPECIES
East of Corridor Within Corridor West of Corridor	SENSITIVE HABITAT
East of Corridor Within Corridor West of Corridor	VEGETATION
Geologic Formation Soil Association	GEOLOGY / SOILS
Blading Tree Removal	OVERLAND TRAVEL
	JURISDICTION



KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Mile Marker

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

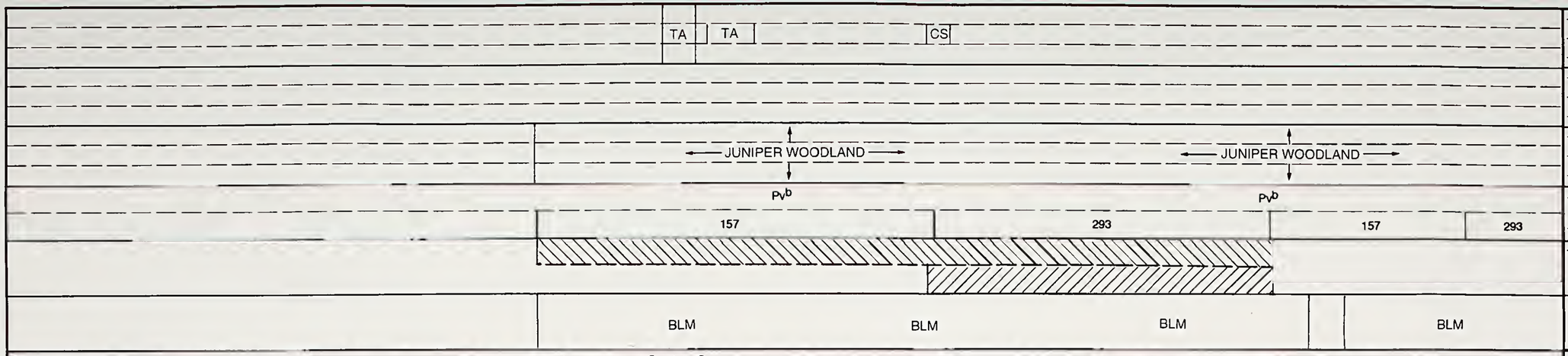
BASEMAP: USGS 7.5 Minute Quadrangle(s):
Alturas, CA 1990;
Mahogany Ridge, CA 1990.

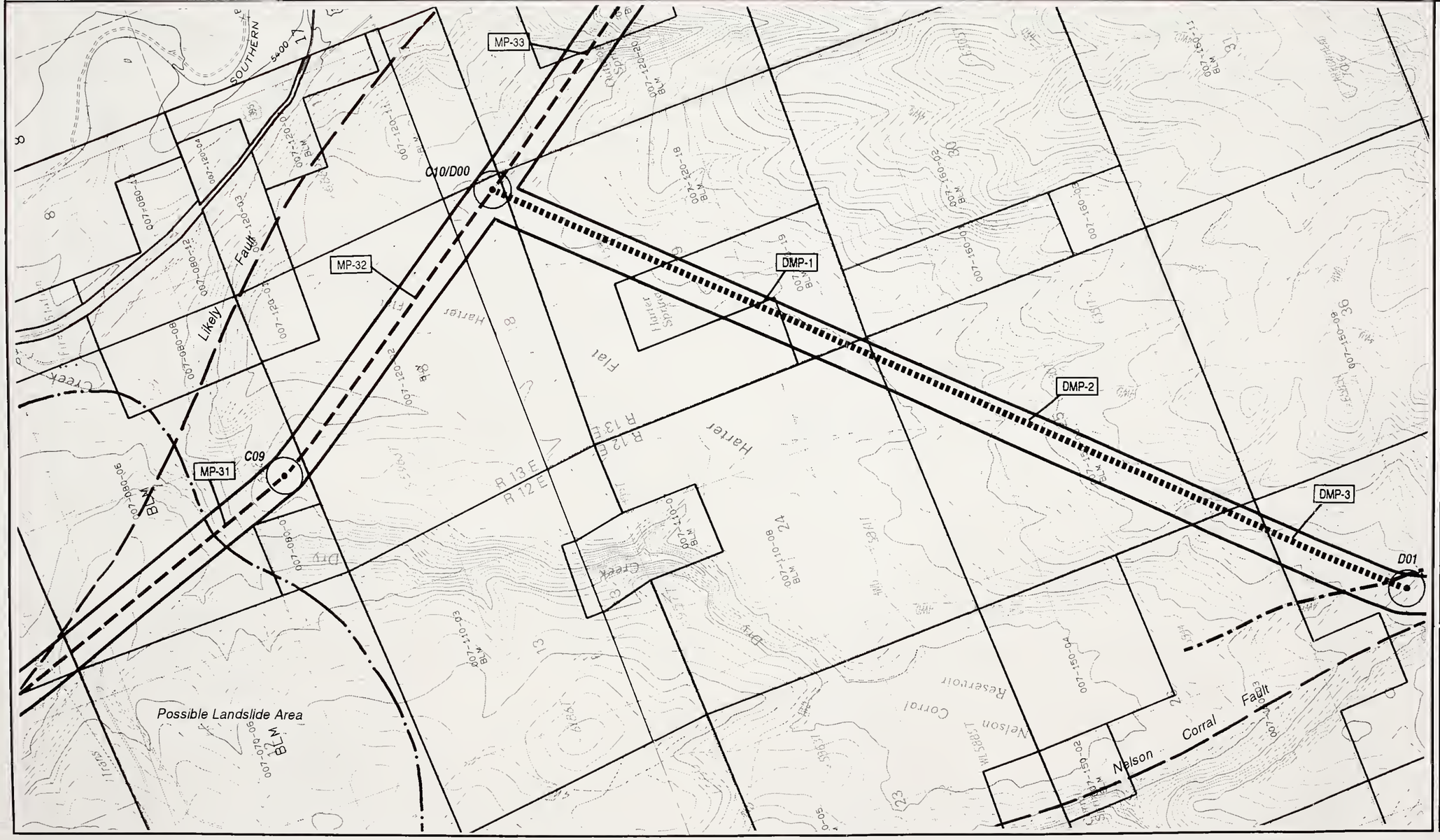
NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map B-1

Alternative Segment [Segment B]





KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 Mile Marker

N E S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s):
Holbrook Canyon, CA 1990;
Likely, CA 1990;
Tule Mountain, CA 1980.

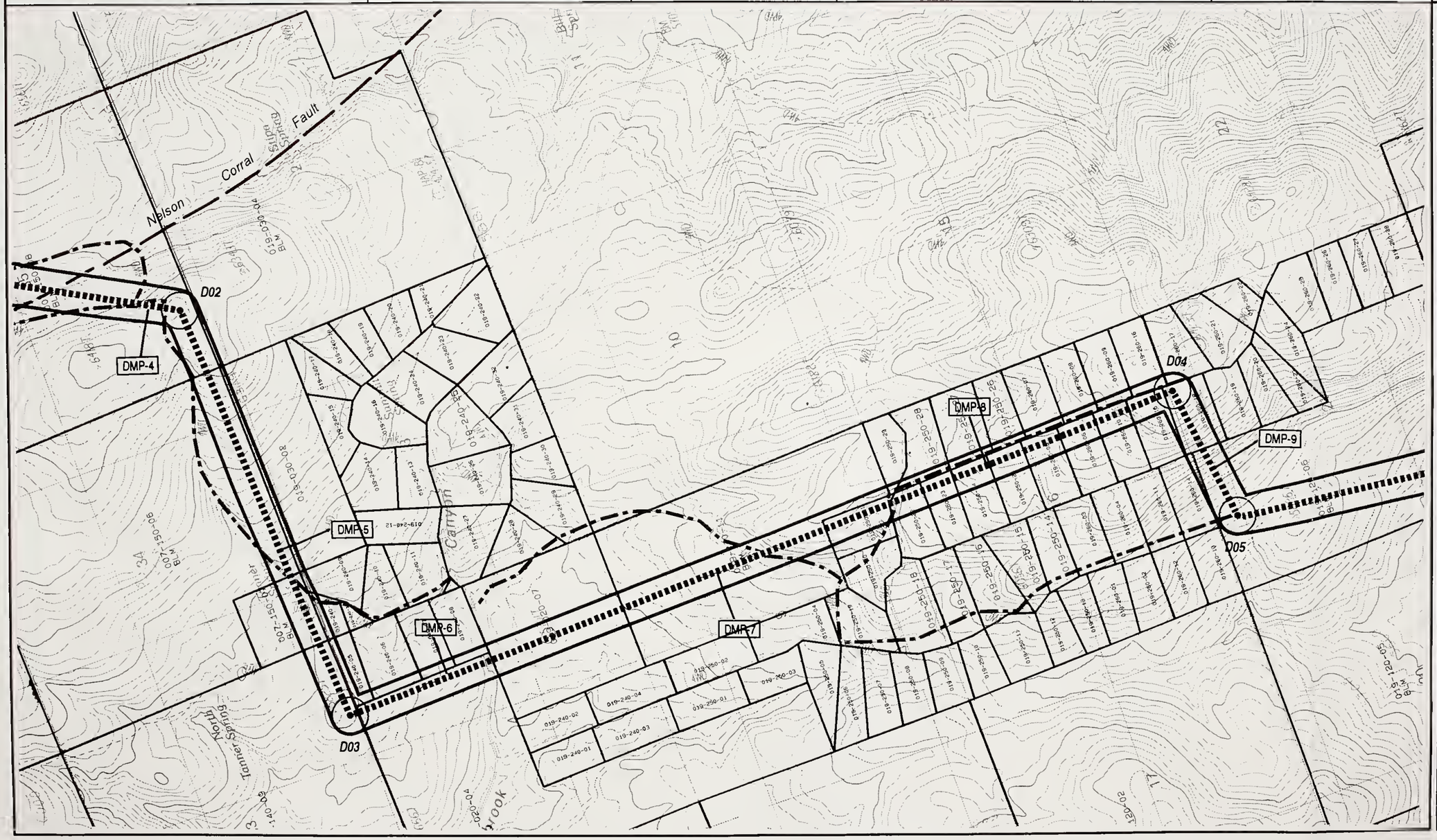
NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map D-1

Alternative Segment [Segment D]

CS, TA, CS, TA, VD, CS, TA, CS/TA, CS, VD, CS, CS, CS, CS	East of Corridor / Within Corridor / West of Corridor — **SENSITIVE SPECIES**
WETLAND	East of Corridor / Within Corridor / West of Corridor — **SENSITIVE HABITAT**
JUNIPER WOODLAND; JUNIPER WOODLAND	East of Corridor / Within Corridor / West of Corridor — **VEGETATION**
Pvb; Pvb; Pvb — 293; 157; 159; 157; 189; 293; 157; 167	Geologic Formation / Soil Association — **GEOLOGY / SOILS**
	Blading / Tree Removal — **OVERLAND TRAVEL**
BLM; BLM; BLM; BLM	**JURISDICTION**



KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Mile Marker

N E S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Holbrook Canyon, CA 1990.*

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map D-2

Alternative Segment [Segment D]

East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

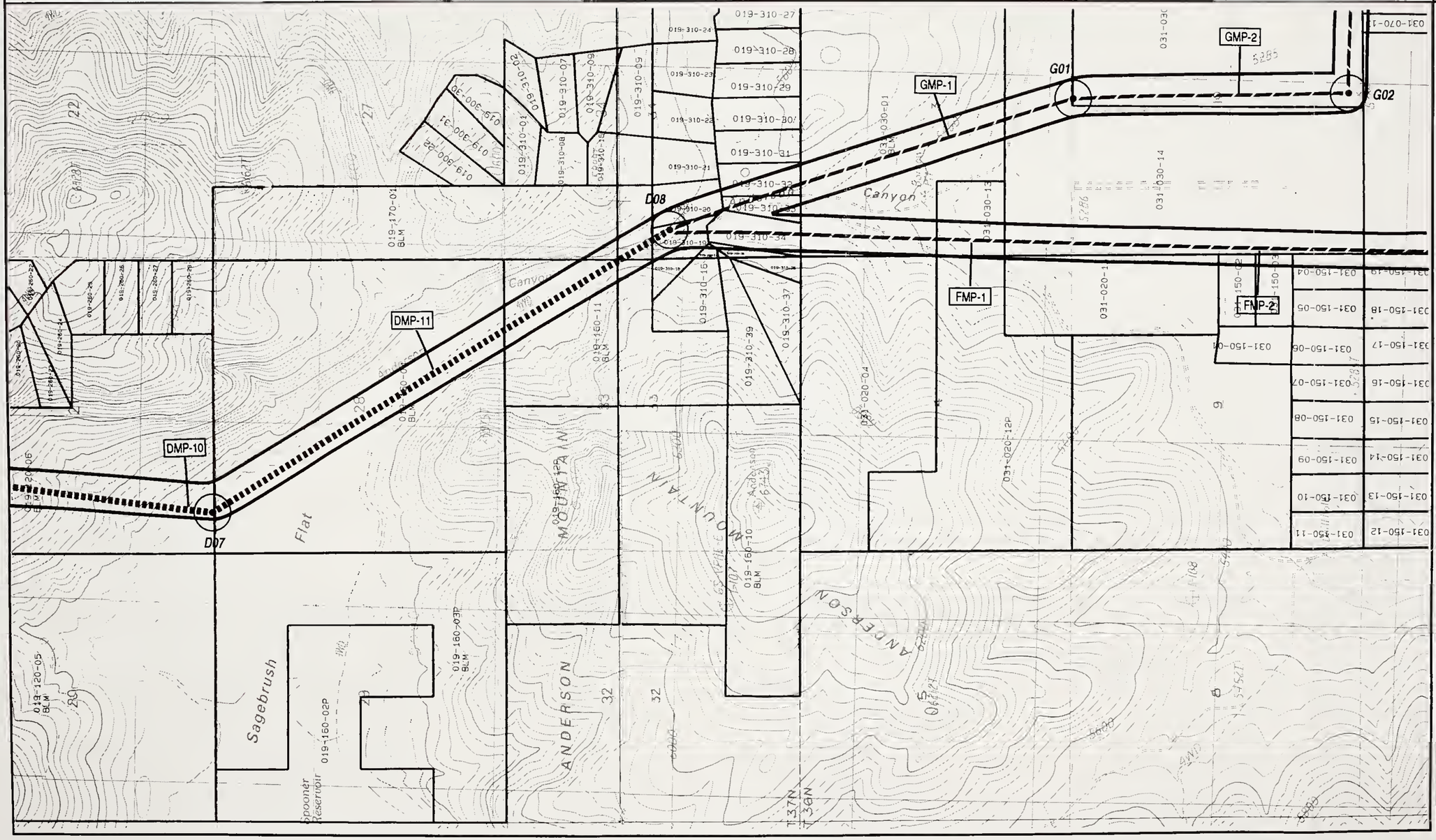
VD VD VD TA VD VD

WETLAND

JUNIPER WOODLAND

Pv^b			Tama					Ql		
159	169	707	169	294	169	585	588	211	210	

BLM BLM BLM



KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Mile Marker

N E S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s):
Anderson Mountain, CA 1989;
Holbrook Canyon, CA 1990.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map D-3

Alternative Segment [Segment D]

| | | |

PL	PL	PL	East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
PRONGHORN SUMMER RANGE	PRONGHORN SUMMER RANGE	PRONGHORN SUMMER RANGE	East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
SILVER SAGEBRUSH SCRUB	SILVER SAGEBRUSH SCRUB	SILVER SAGEBRUSH SCRUB	East of Corridor Within Corridor West of Corridor	**VEGETATION**
QI 210	QI 210	QI 210	QI 210	Geologic Formation Soil Association	**GEOLOGY / SOILS**
				Blading Tree Removal	**OVERLAND TRAVEL**
					JURISDICTION

KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Mile Marker

N W E S

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

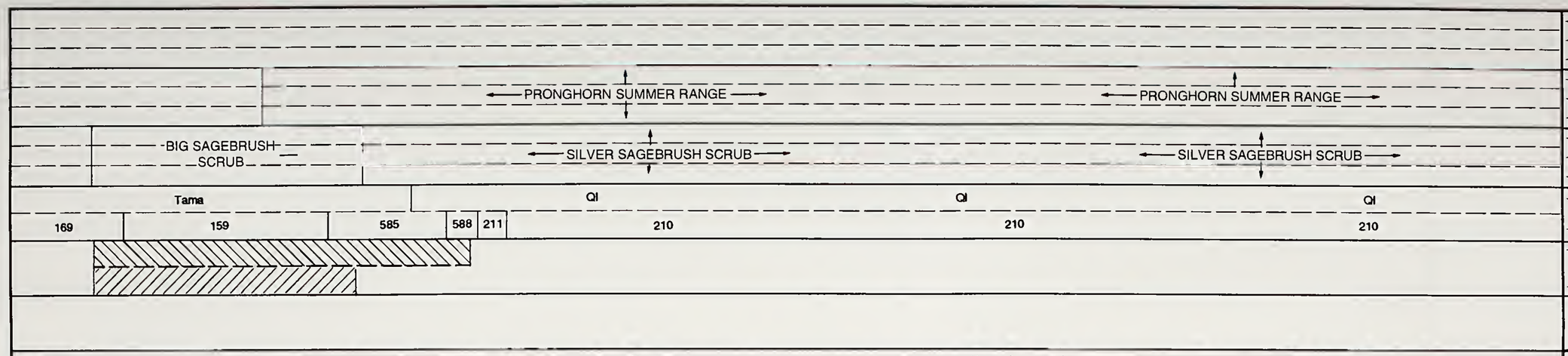
BASEMAP: USGS 7.5 Minute Quadrangle(s):
Anderson Mountain, CA 1989;
Cleghorn Flat, CA 1989.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map F-2

Alternative Segment [Segment F]



East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

KEY

- Alternative Segment (Mapped)
- Other Altemative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 Mile Marker

N W E S

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s):
Anderson Mountain, CA 1989;
Holbrook Canyon, CA 1990.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map G-1

Alternative Segment [Segment G]

PL

PRONGHORN SUMMER RANGE

PRONGHORN SUMMER RANGE

PRONGHORN SUMMER RANGE

SILVER SAGEBRUSH SCRUB

SILVER SAGEBRUSH SCRUB

SILVER SAGEBRUSH SCRUB

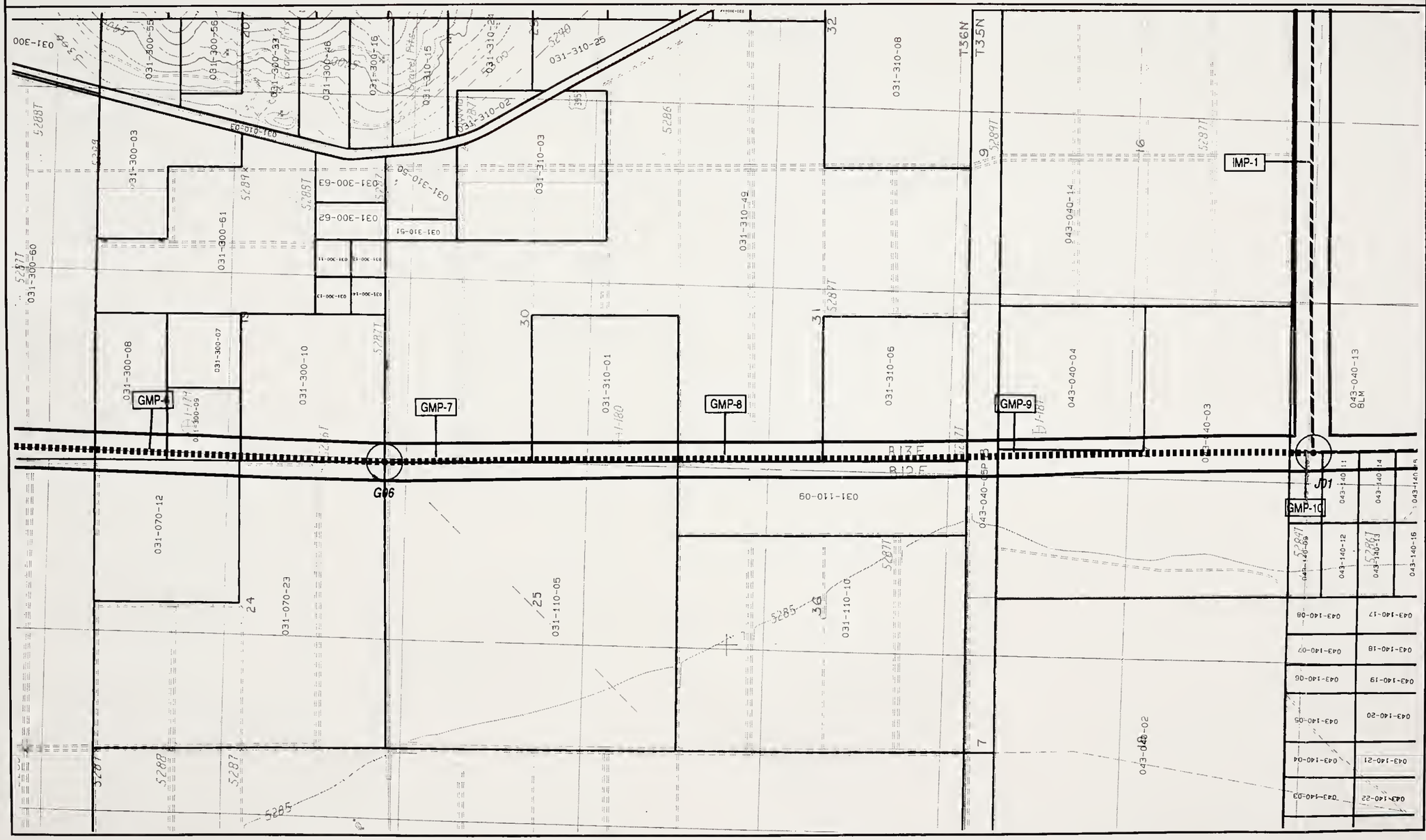
QI 210

QI 210

QI 210

QI 210

◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE SPECIES**
◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE HABITAT**
◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**VEGETATION**
◄ Geologic Formation ◄ Soil Association	**GEOLOGY / SOILS**
◄ Blading ◄ Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION



KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Mile Marker

E N S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Anderson Mountain, CA 1989.*

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map G-2

Alternative Segment [Segment G]

PL PL PL

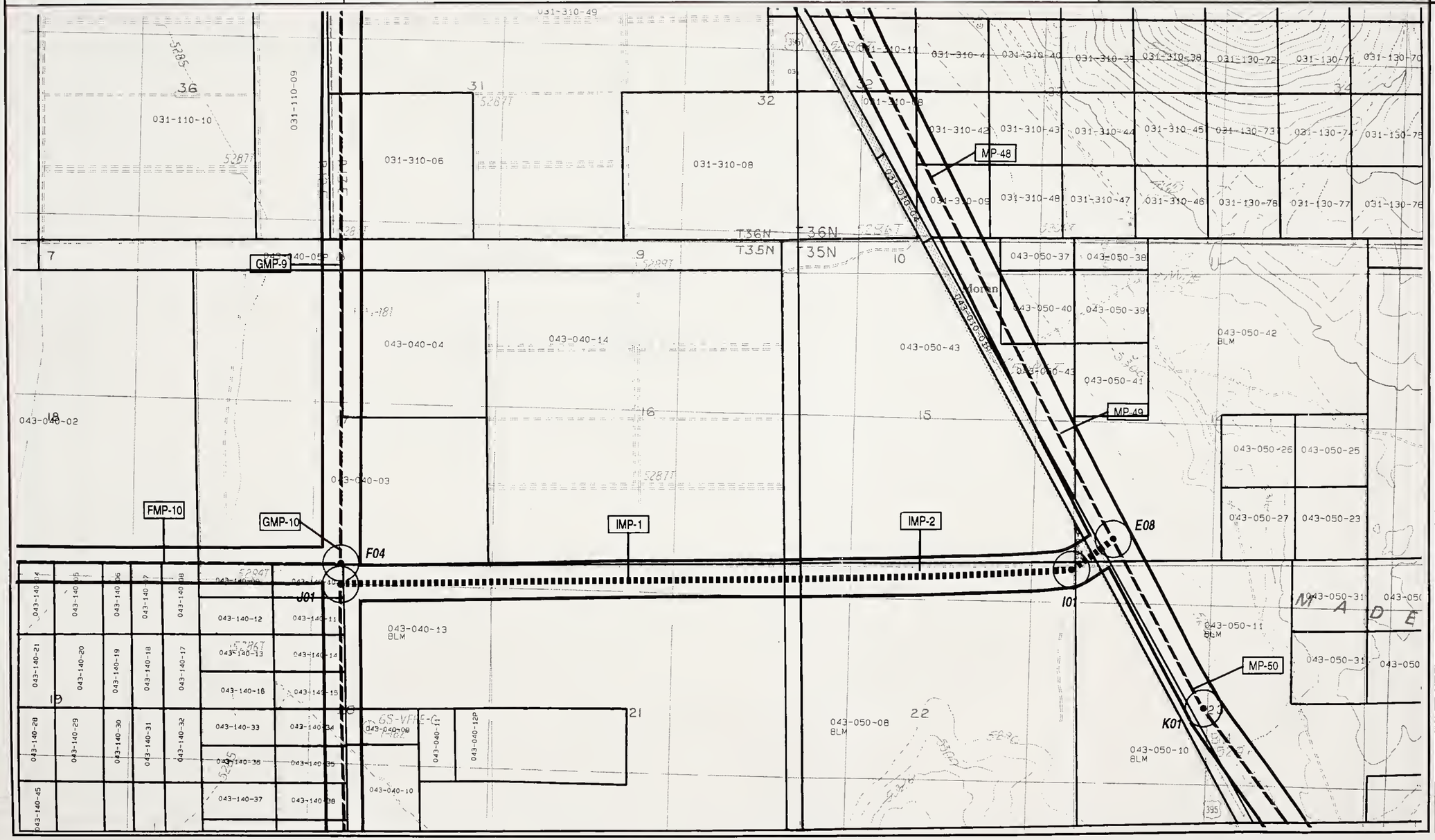
PRONGHORN SUMMER RANGE — PRONGHORN SUMMER RANGE

SILVER SAGEBRUSH SCRUB — SILVER SAGEBRUSH SCRUB

QI 210 | QI 210 | QI 210 | QI 210

BLM | BLM | BLM | BLM

East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION



KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 Mile Marker

N W E S

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s):
Anderson Mountain, CA 1989;
Mc Donald Peak, CA 1989.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map I-1

Alternative Segment [Segment I]

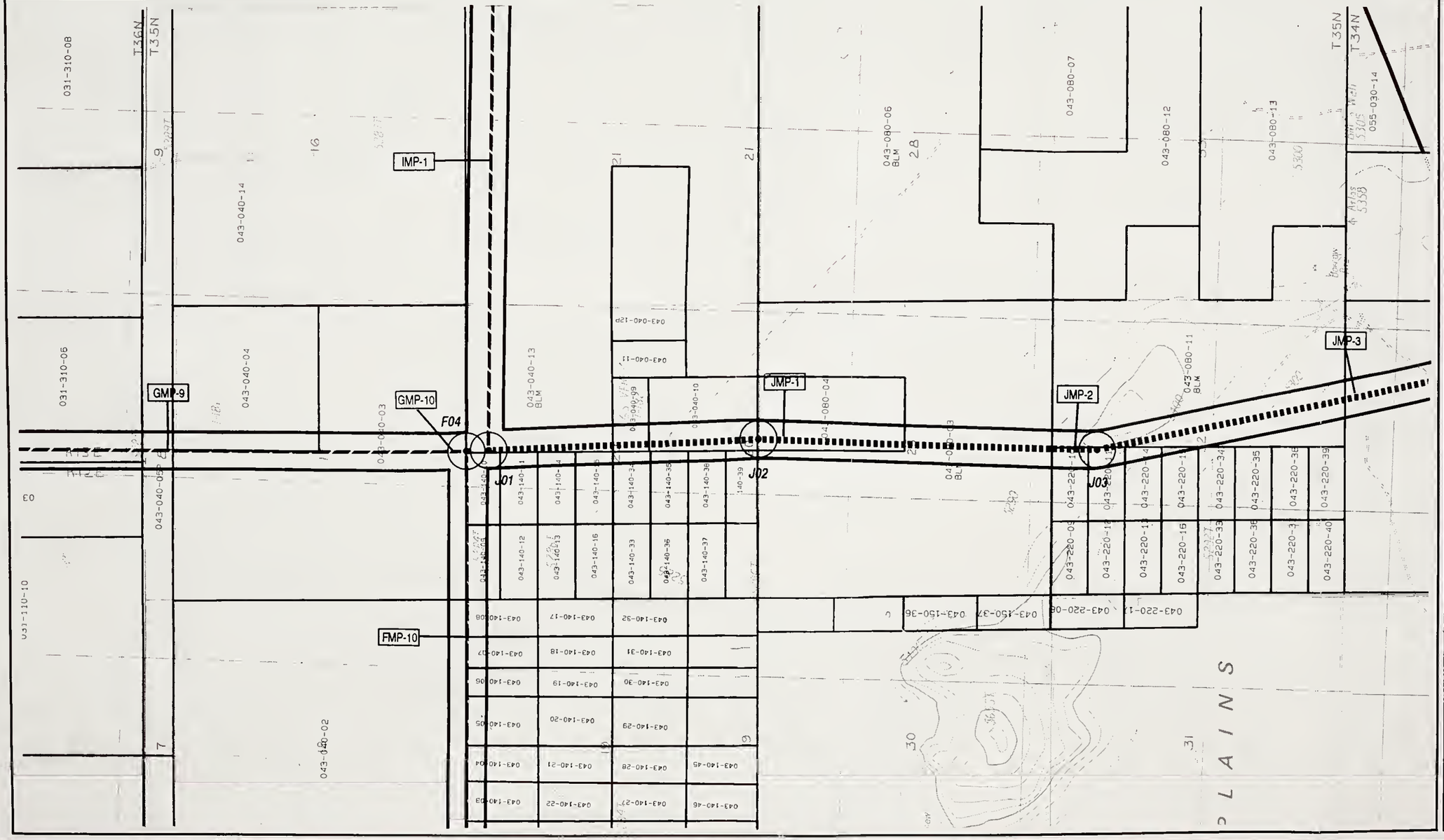
East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

PRONGHORN SUMMER RANGE

PRONGHORN SUMMER RANGE

Ql	Ql		Tdrb		Ql		
210	210	710	585	495	211	710	211

BLM BLM BLM



KEY

- Alternative Segment (Mapped)
- Other Altemative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Mile Marker

E N S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s):
Anderson Mountain, CA 1989;
Cleghorn Flat, CA 1989.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map J-1

Alternative Segment [Segment J]

East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

VD

PRONGHORN SUMMER RANGE

Ql			Tdrb	Tsma	Tsma
495	211	710 211	495	304	304

BLM	BLM	BLM		BLM		BLM	BLM	BLM

JMP-3 JMP-4 JMP-5 JMP-6 JMP-7

CUM-17

J04 J05

KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 Mile Marker

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Cleghorn Flat, CA 1989; Termo, CA 1989.*

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map J-2

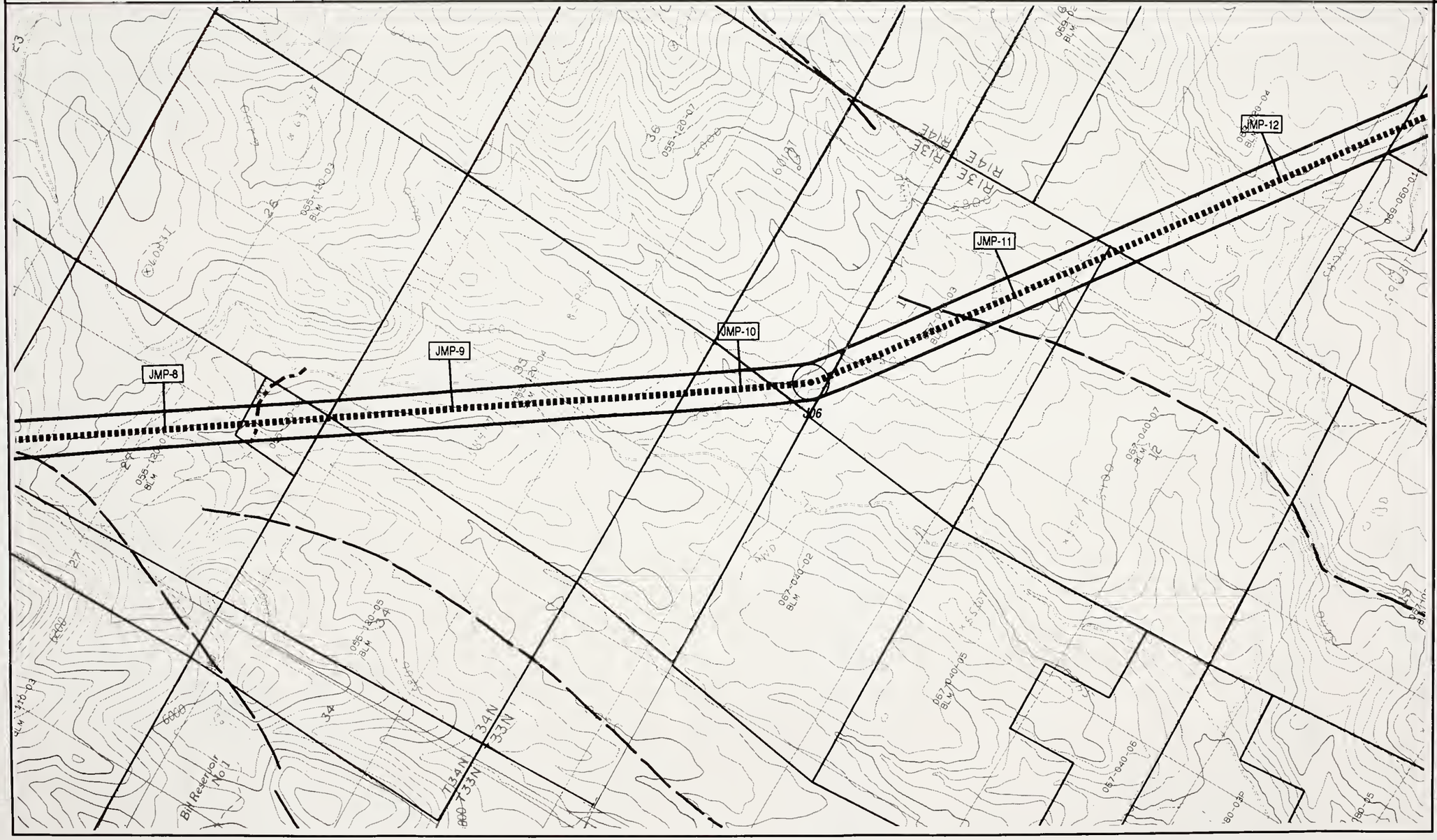
Alternative Segment [Segment J]

East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

Tsma | Twra | Twra | Tppt

304 | 304 | 304 | 304

BLM | BLM | BLM | BLM | BLM | BLM | BLM



KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Mile Marker

N W E S

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

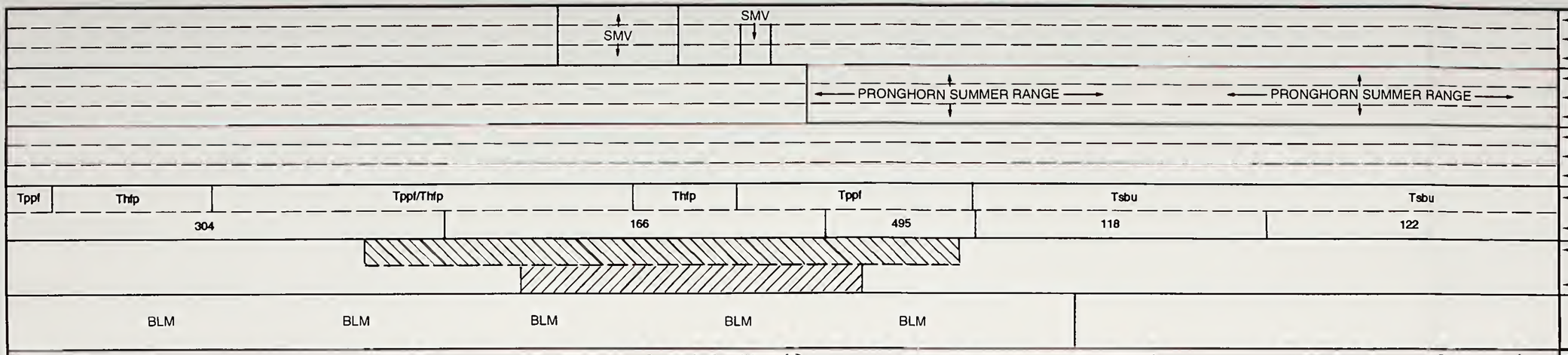
BASEMAP: USGS 7.5 Minute Quadrangle(s):
Snowstorm Mountain, CA 1989;
West of Snowstorm Mountain, CA 1989;
Termo, CA 1989.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

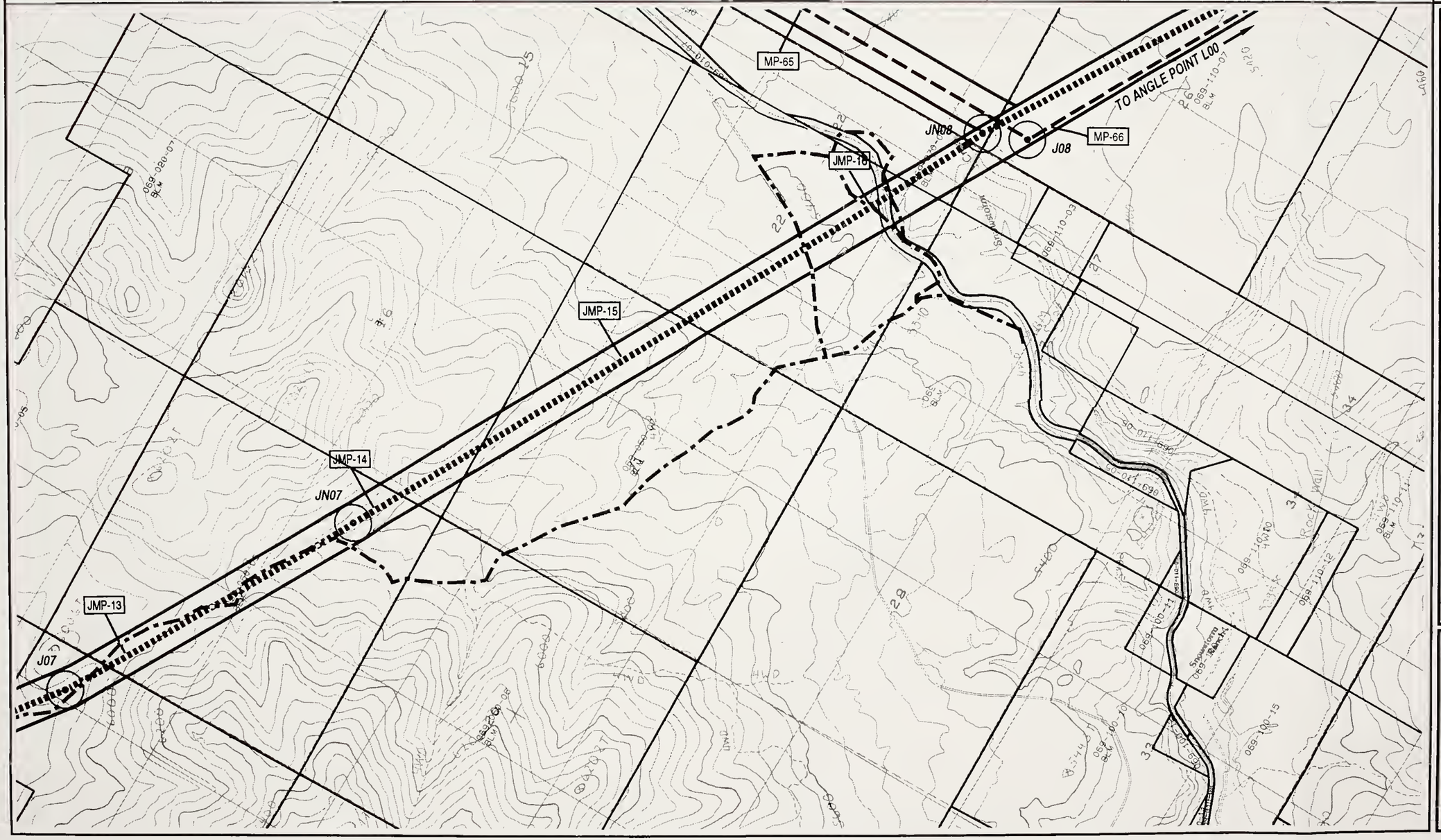
ALTURAS TRANSMISSION LINE EIR/S

Map J-3

Alternative Segment [Segment J]



East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION



KEY

- Alternative Segment (Mapped)
- Other Altemative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Mile Marker

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s):
Snowstorm Mountain, CA 1989;
West of Snowstorm Mountain, CA 1989.

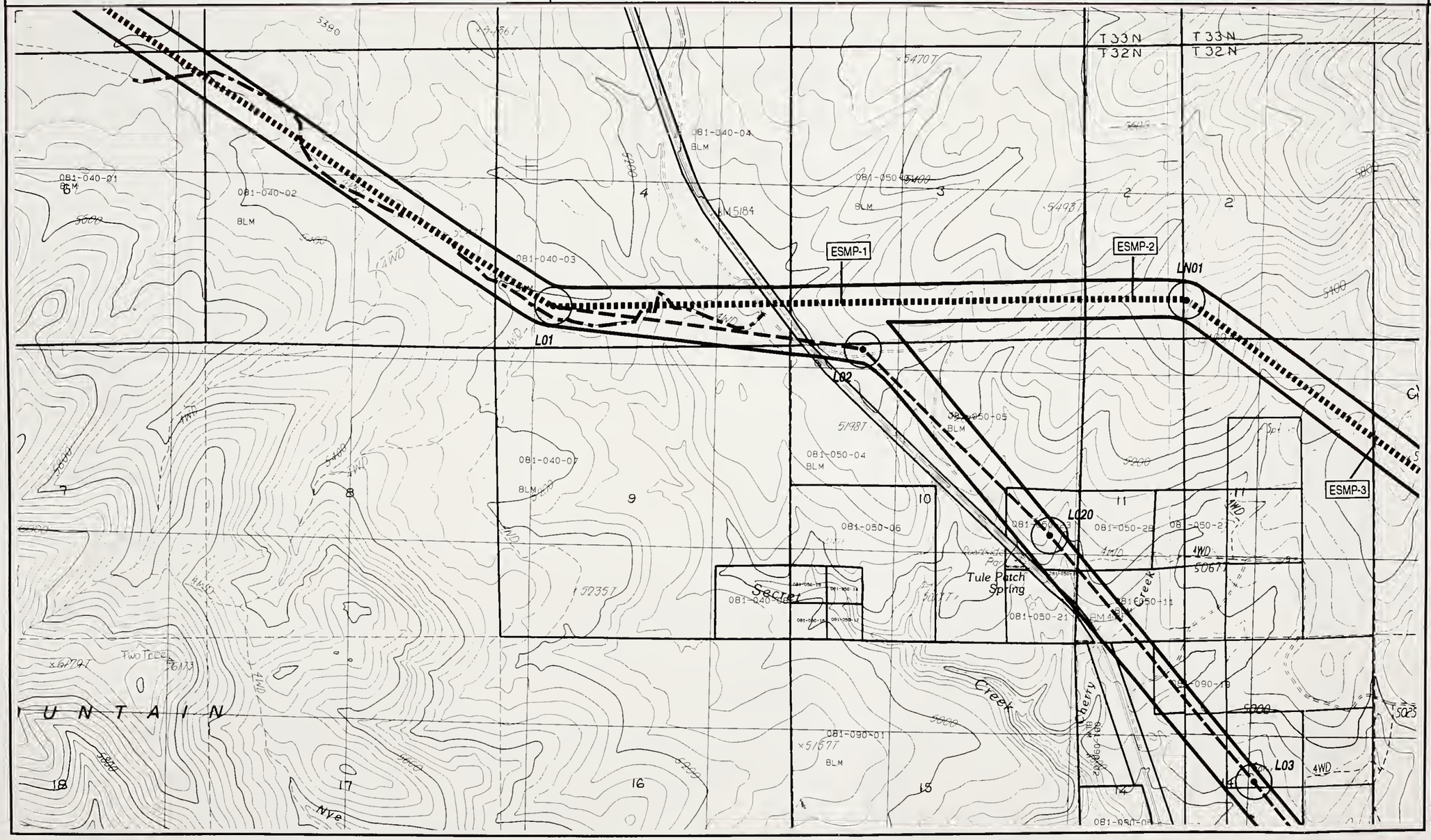
NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map J-4

Alternative Segment [Segment J]

	SMV HM	North of Corridor Within Corridor South of Corridor	**SENSITIVE SPECIES**
	MULE DEER WINTERING AND MIGRATION CORRIDOR PRONGHORN ANTELOPE SUMMER AND FALL USE, AND KIDDING AREA	North of Corridor Within Corridor South of Corridor	**SENSITIVE HABITAT**
	VOLCANIC VERTISOLS BIG SAGEBRUSH SCRUB LOW SAGEBRUSH SCRUB	North of Corridor Within Corridor South of Corridor	**VEGETATION**
	Tsbl Tms Tms Tms 413	Geologic Formation Soil Association	**GEOLOGY / SOILS**
		Blading Tree Removal	**OVERLAND TRAVEL**
	BLM BLM		**JURISDICTION**



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker
- Altemative Segment (Mapped)
- Other Alternative Segment

N
W E
S

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Snowstorm Mountain, CA* 1989; *Shinn Mountain, CA* 1989.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

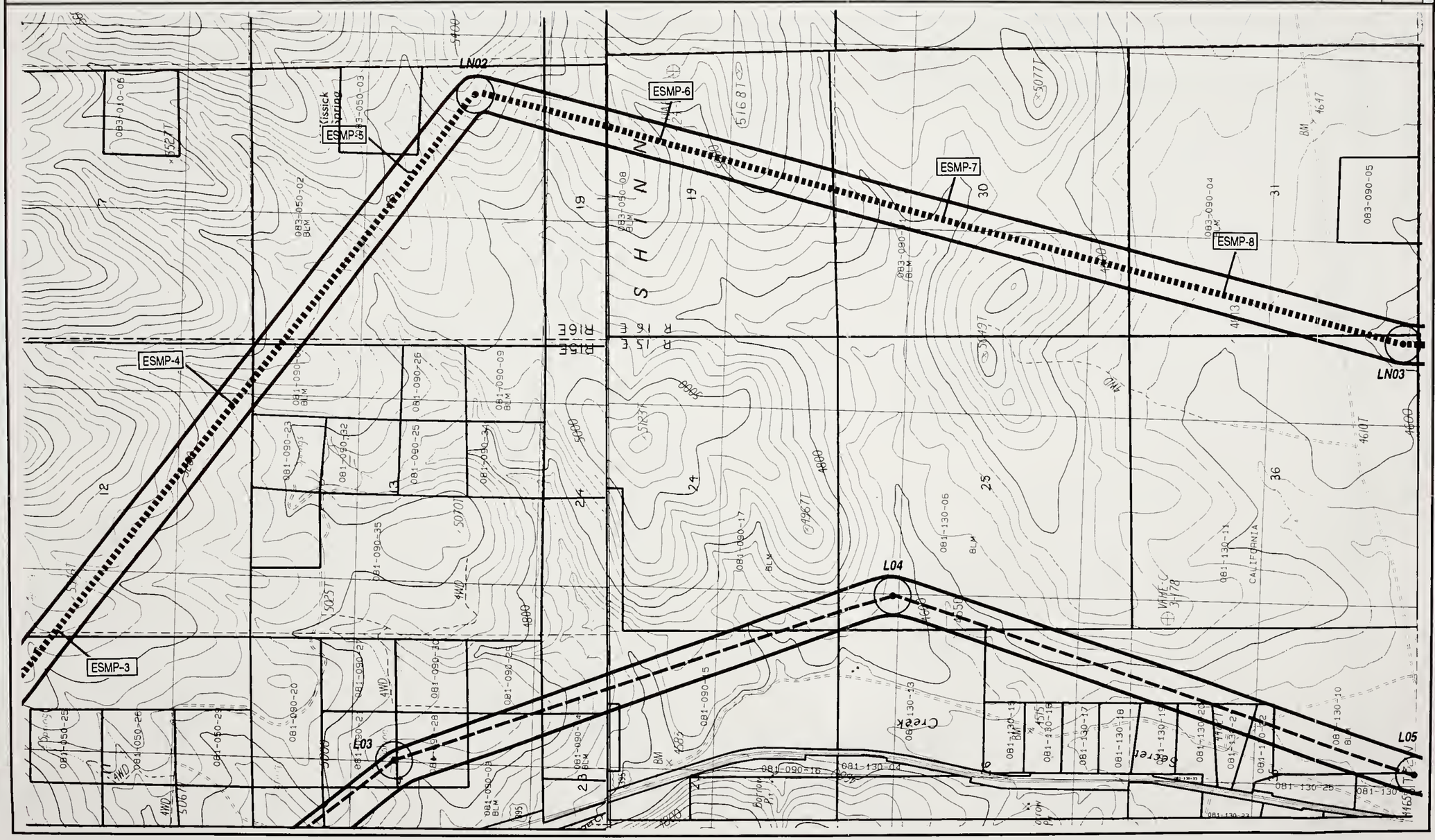
ALTURAS TRANSMISSION LINE EIR/S

Map ESVA-1

Alternative Segment

[Segment Eastern Secret Valley]

SMV		East of Corridor Within Corridor West of Corridor	SENSITIVE SPECIES
MULE DEER WINTERING AND MIGRATION CORRIDOR PRONGHORN ANTELOPE SUMMER AND FALL USE, AND KIDDING AREA	MULE DEER WINTER USE AND MIGRATION	East of Corridor Within Corridor West of Corridor	SENSITIVE HABITAT
LOW SAGEBRUSH SCRUB; GREAT BASIN MIXED SCRUB; LOW SAGEBRUSH SCRUB; BIG SAGEBRUSH SCRUB	LOW SAGEBRUSH SCRUB; BIG SAGEBRUSH SCRUB	East of Corridor Within Corridor West of Corridor	VEGETATION
Tms 413; Tms; Tms; Qc 208	Tms 266; Qscb; Tbt	Geologic Formation Soil Association	GEOLOGY / SOILS
		Blading Tree Removal	OVERLAND TRAVEL
BLM; BLM; BLM; STATE OF CALIFORNIA			JURISDICTION



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker
- Alternative Segment (Mapped)
- Other Alternative Segment

E
N S
W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Five Springs, CA* 1989; *Shinn Mountain, CA* 1989.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

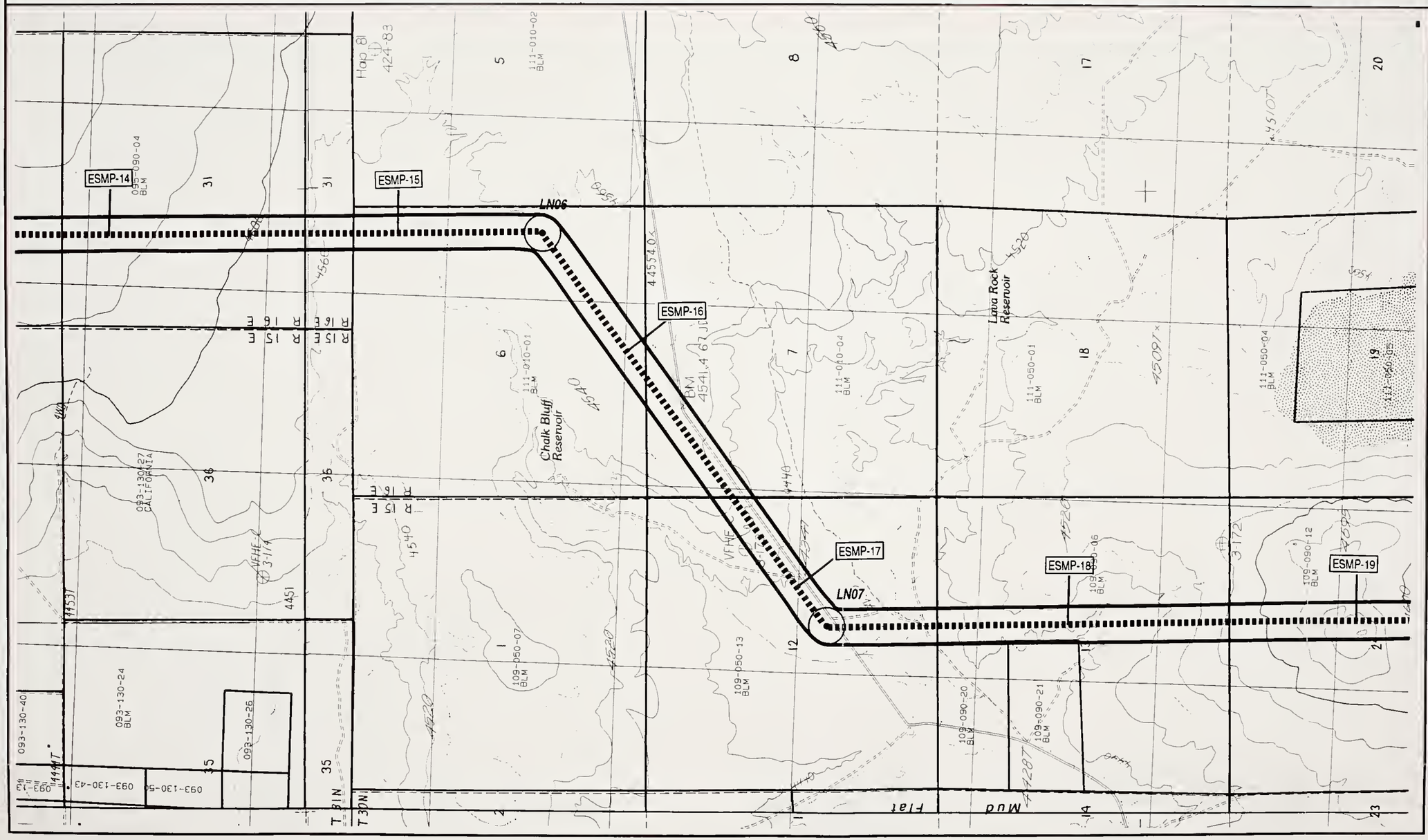
Map ESVA-2

Alternative Segment

[Segment Eastern Secret Valley]

| | | |

		SM		GPP			East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
		PRONGHORN ANTELOPE KIDDING AND YEAR LONG USE AREA					East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
LOW SAGEBRUSH SCRUB		BIG SAGEBRUSH SCRUB		GREAT BASIN MIXED SCRUB	LOW SAGEBRUSH SCRUB		East of Corridor Within Corridor West of Corridor	**VEGETATION**
Tlrb	Tlrb	Tlrb	Tlrt	Tvsa	Tvsa		Geologic Formation Soil Association	**GEOLOGY / SOILS**
266	203	186	205	186			Blading Tree Removal	**OVERLAND TRAVEL**
								JURISDICTION



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker
- Alternative Segment (Mapped)
- Other Alternative Segment

E
N S
W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Five Springs, CA* 1989; *Little Mud Flat, CA* 1989.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map ESVA-4

Alternative Segment

[Segment Eastern Secret Valley]

SM

PRONGHORN ANTELOPE KIDDING AND YEAR LONG USE AREA

LOW SAGEBRUSH SCRUB

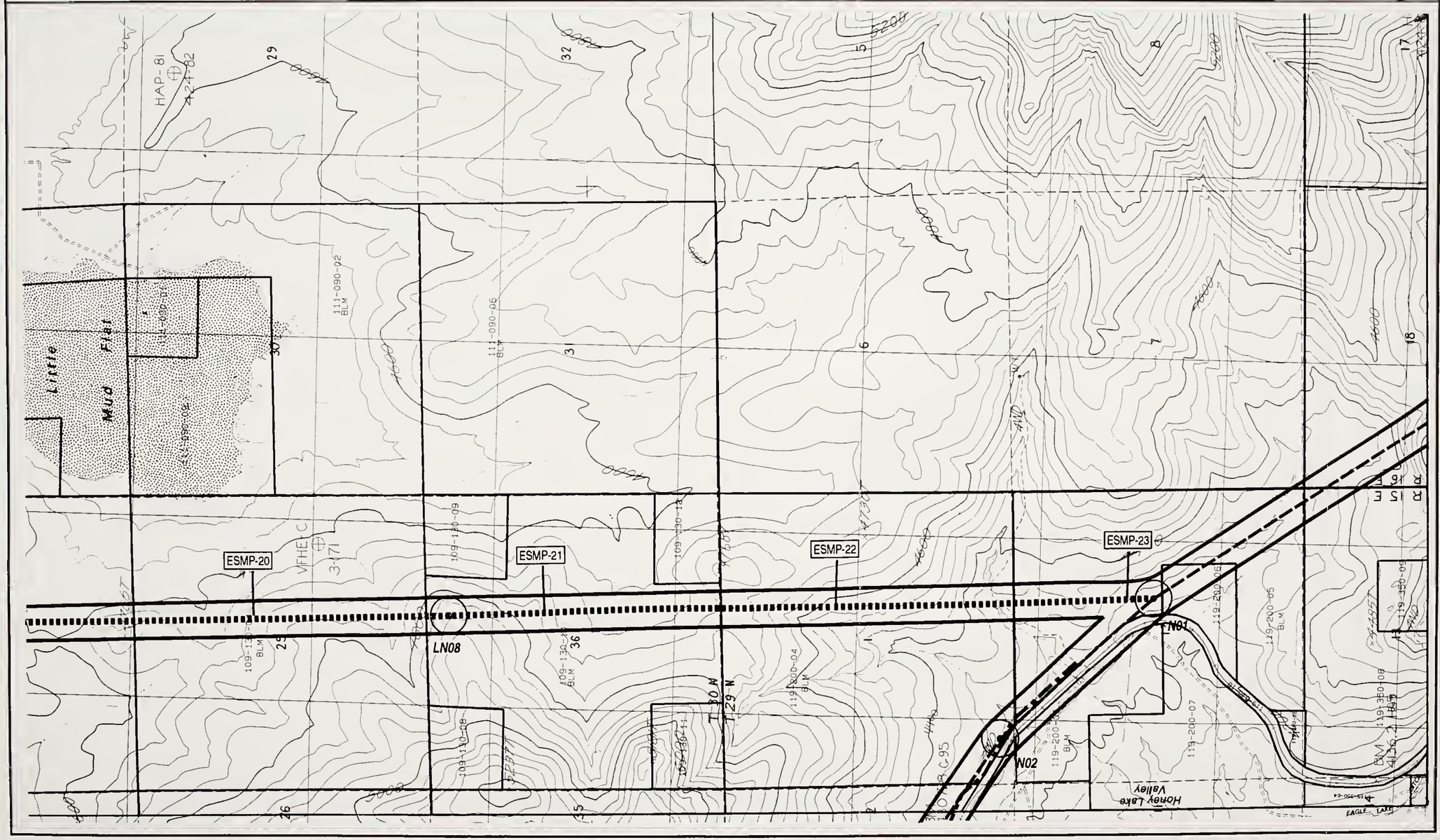
DISTURBED

Tvsa | Tvsa | Tvsa | Twa

186 | 185

BLM | BLM | BLM

East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION



KEY

- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Proposed Route Mile Marker
- Alternative Segment (Mapped)
- Other Alternative Segment

E N S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Little Mud Flat, CA* 1989.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

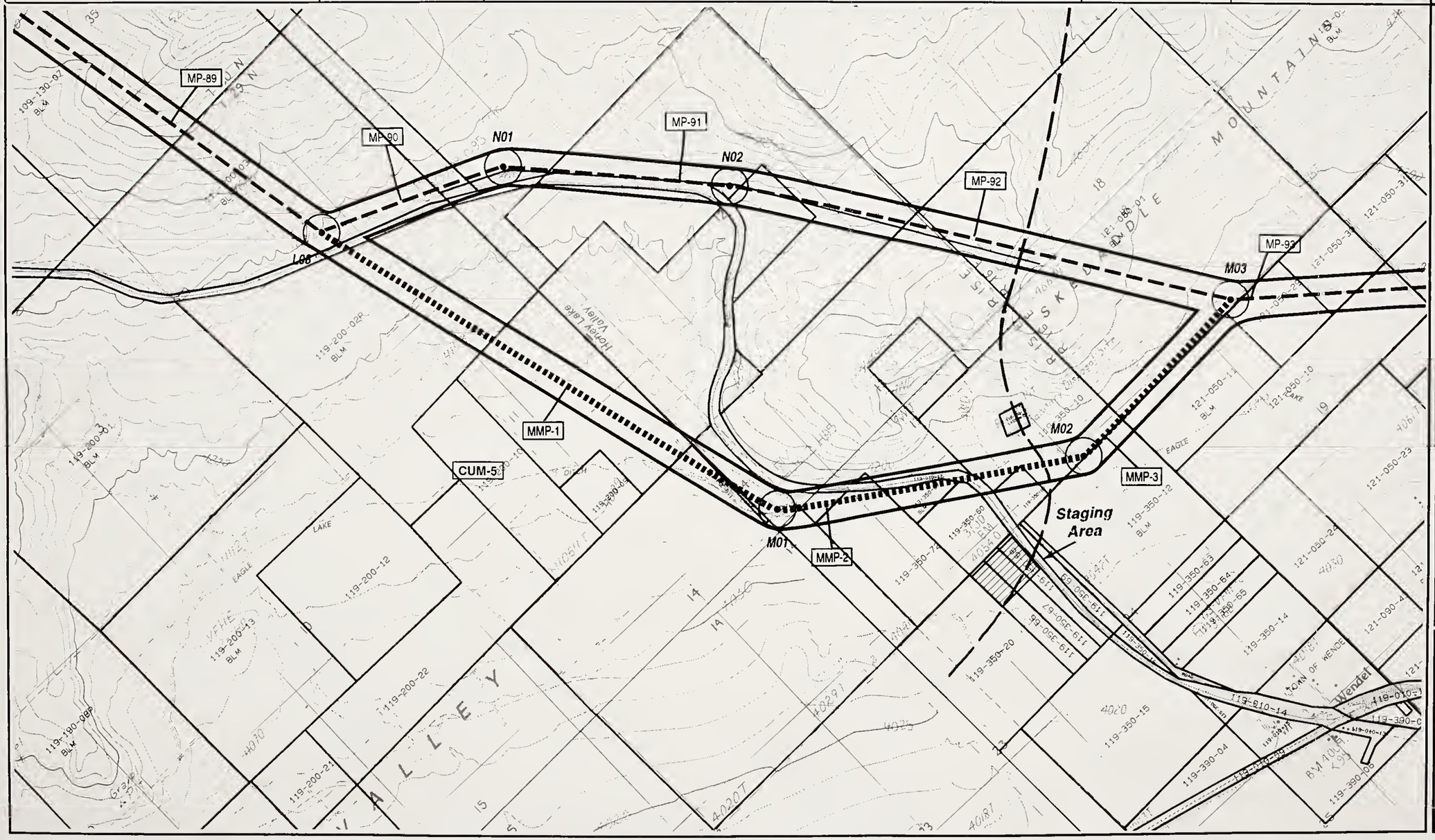
ALTURAS TRANSMISSION LINE EIR/S

Map ESVA-5

Alternative Segment

[Segment Eastern Secret Valley]

	SM						East of Corridor Within Corridor West of Corridor — **SENSITIVE SPECIES**
	PRONGHORN YEAR ROUND AREA	PRONGHORN WINTER RANGE AREA		PRONGHORN WINTER RANGE AREA			East of Corridor Within Corridor West of Corridor — **SENSITIVE HABITAT**
	SAGEBRUSH/ BITTERBRUSH SCRUB			SAGEBRUSH/ BITTERBRUSH SCRUB			East of Corridor Within Corridor West of Corridor — **VEGETATION**
	Tvsa / 185	Qlg / 380	310	Ql / 380	310/380	Ql / 185/360	185 — Geologic Formation Soil Association — **GEOLOGY / SOILS**
							Blading Tree Removal — **OVERLAND TRAVEL**
	BLM				BLM		**JURISDICTION**



KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Mile Marker

N W E S

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s):
Little Mud Flat, CA 1988;
Shaffer Mtn, 1988; Wendel, CA 1988;
Wendel Hot Springs, CA 1988.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map M-1

Alternative Segment [Segment M]

East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

LLSP LLSP LLSP

STABILIZED/PARTIALLY STABILIZED DUNES — STABILIZED/PARTIALLY STABILIZED DUNES — BIG SAGEBRUSH SCRUB

Qla		Qld		Qld	Qd		Qc				Kgr
358	365	310		609	314	678	314	335	674	335	674	677

BLM BLM BLM STATE OF CALIFORNIA STATE OF CALIFORNIA

MP-112 MP-111 MP-105 PMP-1 PMP-2 PMP-3 PMP-4 005 P01

Fault Valley Springs Warm 4 Zone 1950 Fort Sage Rupture Honey Lake Fault

DOYLE WILDLIFE AREA HONEY LAKE WILDLIFE AREA BOUNDARY

KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 Mile Marker

E N S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): ***Calneva Lake, CA 1988; Doyle, CA 1988.***

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map P-1

Alternative Segment [Segment P]

East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

BIG SAGEBRUSH SCRUB

SAGEBRUSH/BITTERBRUSH SCRUB

SAGEBRUSH/BITTERBRUSH SCRUB

Kgr | Kgr | Kgr | Kgr

677 | 688 | 596 | 596/163 | 596 | 674 | 677 | 596 | 677

BLM | BLM | BLM | BLM | BLM | BLM | BLM

CUM-8

PMP-5 PMP-6 PMP-7 PMP-8 PMP-9

P02 P03 P04

[Active] [Active]

1950 Fort Sage Rupture

Honey Lake Fault

FORT SAGE WILDLIFE AREA

KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 Mile Marker

E N S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): ***Doyle, CA 1988.***

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map P-2

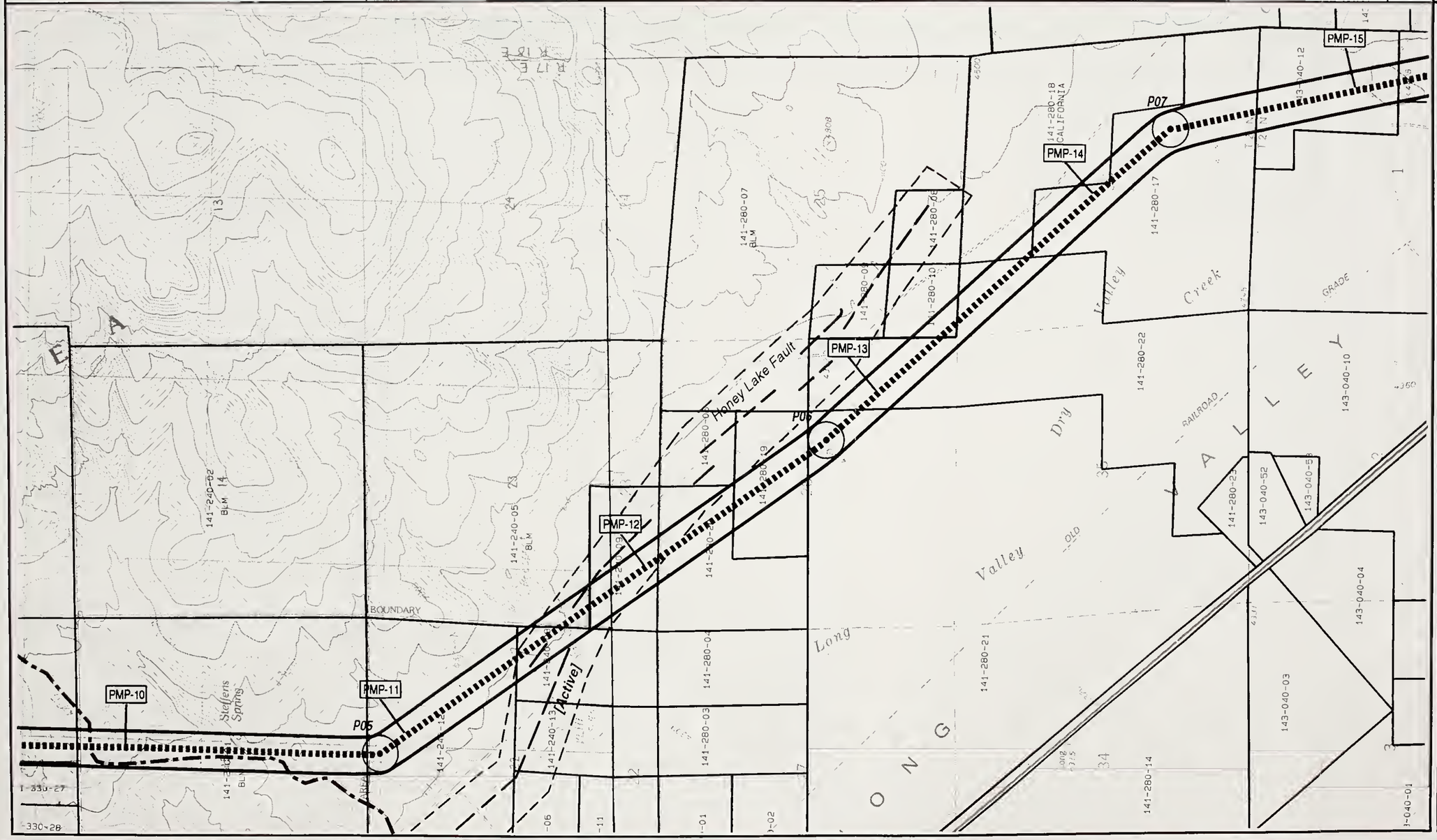
Alternative Segment [Segment P]

East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

SAGEBRUSH/BITTERBRUSH SCRUB — MONTANE MEADOW — MONTANE MEADOW

Kgr			Qc			Qa				Qa				Tvv
308	596	677	674/677	674	385	860	860/384	860	384	860	474	384	860	585

BLM BLM BLM BLM



KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 — Mile Marker

E N S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Constantia, CA 1977; Doyle, CA 1988.*

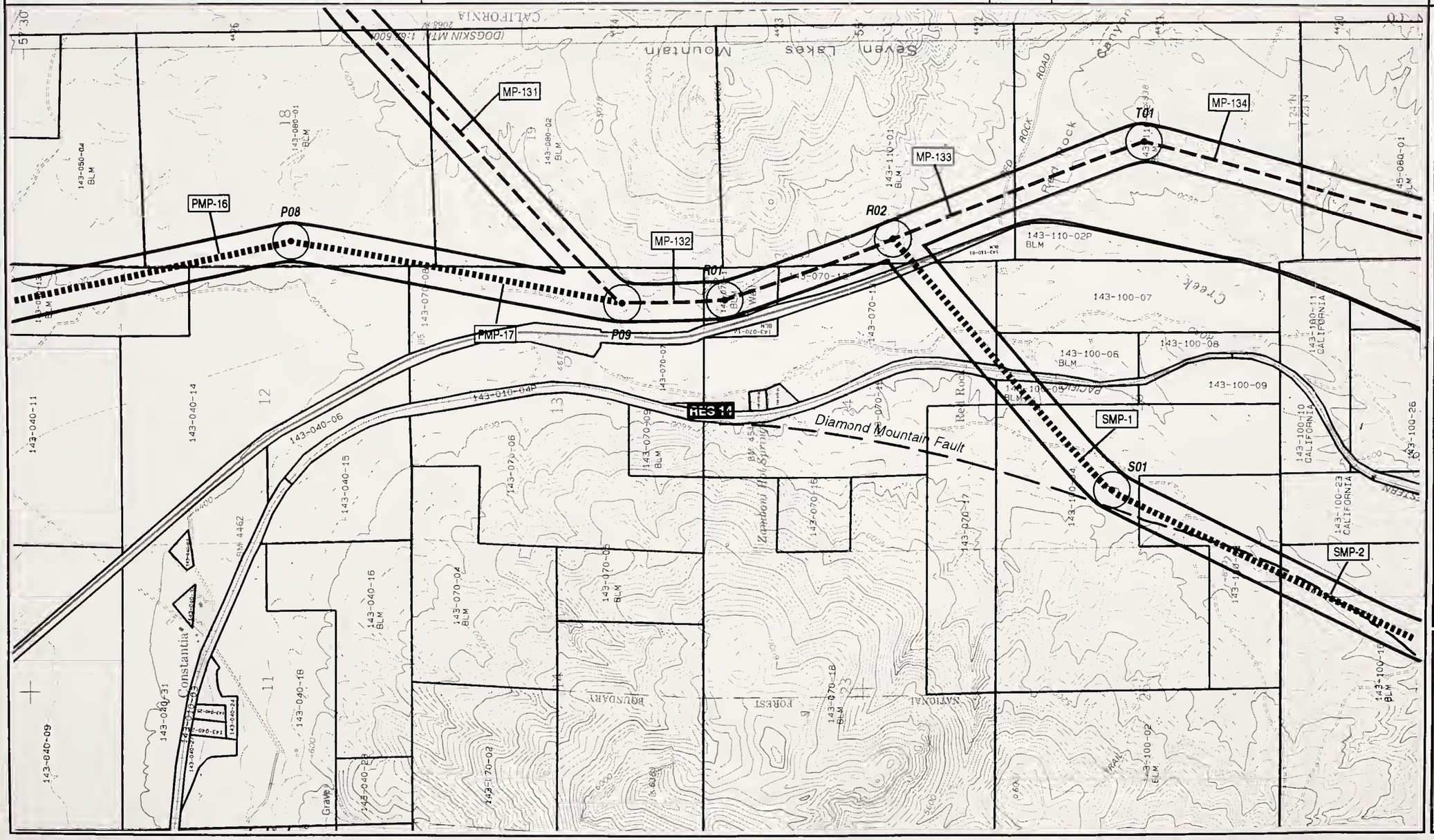
NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map P-3

Alternative Segment [Segment P]

	◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE SPECIES**
DEER WINTER RANGE; DEER MIGRATION; WETLANDS; WET-LANDS	◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**SENSITIVE HABITAT**
MONTANE MEADOW; JUNIPER WOODLAND; MONTANE MEADOW	◄ East of Corridor ◄ Within Corridor ◄ West of Corridor	**VEGETATION**
Qc 477; Tvv; Qc 674; 682; Tvv 674; Qc 682; Qa 580; Kgd 674; Th_3 682; 674; Qa/Qc 530; 597; Th_3 674; 597; 682; Kgdb 597; Th_3	◄ Geologic Formation ◄ Soil Association	**GEOLOGY / SOILS**
	◄ Blading ◄ Tree Removal	**OVERLAND TRAVEL**
BLM; BLM; BLM		**JURISDICTION**



KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 Mile Marker

N E S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): ***Constantia, CA 1977.***

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map P-4

Alternative Segment [Segments P & S]

East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

WETLANDS

JUNIPER WOODLAND | MONTANE MEADOW | JUNIPER WOODLAND | JUNIPER WOODLAND

Th3	Kgdb	Th3		Qc	Qa	Qc	bb	Th2
674	597	682	597	682	597	662	597	682	560	595/662	595

BLM | BLM | BLM | BLM | BLM

MP-134 MP-135 MP-136 MP-137

T01 T02

WN01

SMP-1 SMP-2 SMP-3

S01 S02 SN01

UMP-1 UMP-2

See Map P-4

Alignment S

Alignment U

Diamond Mountain Fault

KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 Mile Marker

N E S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s):
Constantia, CA 1977;
Beckwourth Pass, CA 1975.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map S-1

Alternative Segment [Segments S & U]

East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**GEOLOGIC HAZARDS**
	JURISDICTION

JUNIPER WOODLAND

DISTURBED/ CULTIVATED

DISTURBED/ CULTIVATED

Th_2	Th_2	Th_1	Th_2
597	983	984	587	983	479	983	597	983	597	984	597

BLM BLM BLM BLM BLM

ZMP-1 ZMP-2 ZMP-3 ZMP-4

WN02 WN03

W01 W02 W04

MP-139 MP-140 MP-141 MP-142

KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 Mile Marker

E N S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): ***Beckwourth Pass, CA 1975.***

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map Z-1

Alternative Segment [Segment Z]

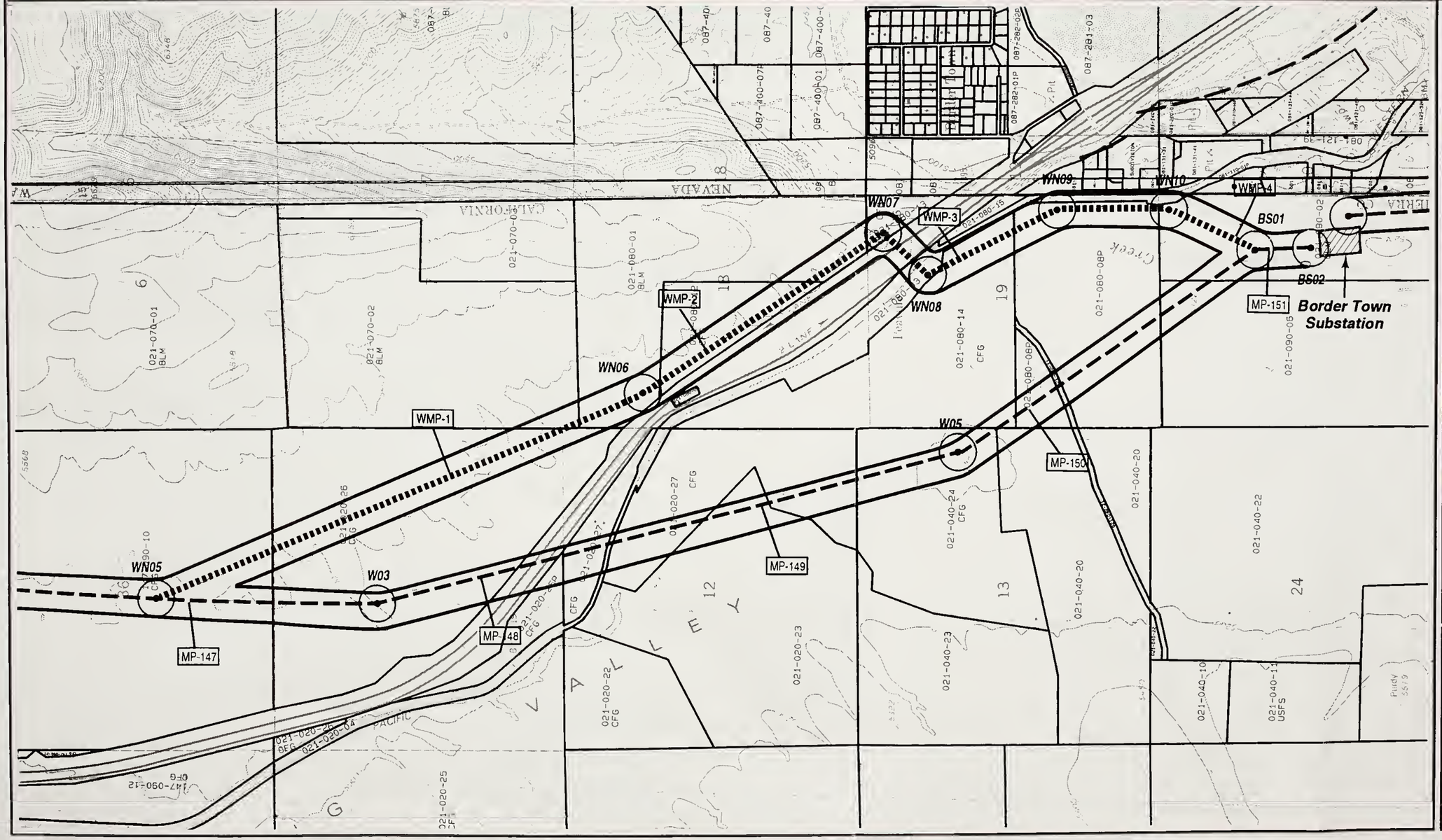
East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

SAGEBRUSH/ BITTERBRUSH SCRUB

SAGEBRUSH/ BITTERBRUSH SCRUB

Thu 597 | 963 | 597 | 963 | Thu 597 | 963 | 597 | Qa | Thu 933 | Qa 939 | Thu 567 | Thu 956

CALIFORNIA DEPT. OF FISH & GAME | BLM | CDFG | CDFG | BLM



KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 Mile Marker

N E S W

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s):
Evans Canyon, CA-NV 1978;
Reno NW, NV 1982.

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map WCFG

Alternative Segment [Segment WCFG]

East of Corridor Within Corridor West of Corridor	**SENSITIVE SPECIES**
East of Corridor Within Corridor West of Corridor	**SENSITIVE HABITAT**
East of Corridor Within Corridor West of Corridor	**VEGETATION**
Geologic Formation Soil Association	**GEOLOGY / SOILS**
Blading Tree Removal	**OVERLAND TRAVEL**
	JURISDICTION

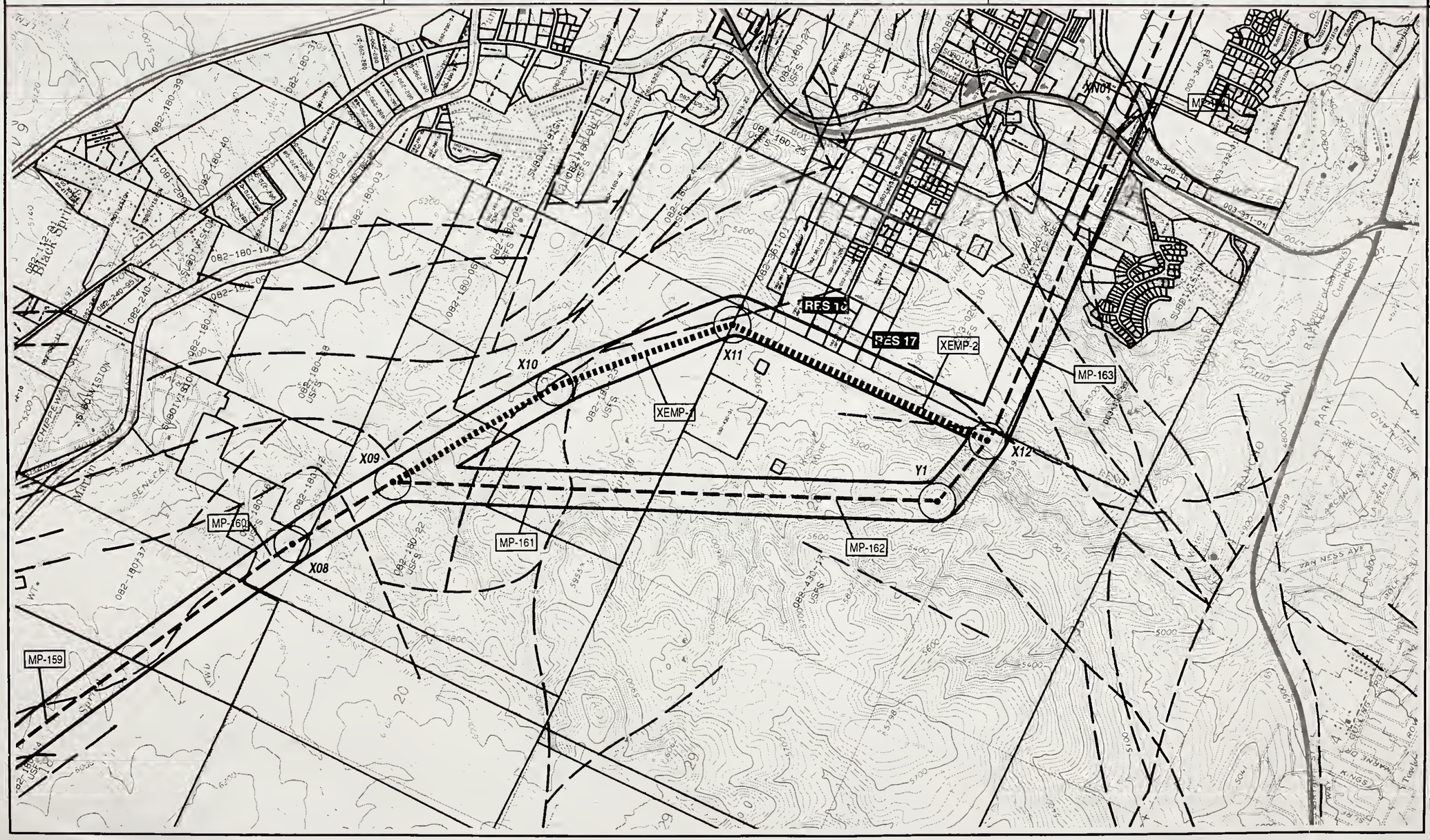
AAB

ALTERED ANDESITE — ALTERED ANDESITE

Ta — Ta — Ta

281 | 900 | 880 | 281 | 331 | 280 | 331 | 901

BLM — BLM — BLM



KEY

- Alternative Segment (Mapped)
- Other Alternative Segment
- Alturas Transmission Line Proposed Route
- Angle Point
- MP-50 Mile Marker

N W E S

0 2000 4000
Scale in Feet

0 1/2 1
Scale in Miles

BASEMAP: USGS 7.5 Minute Quadrangle(s): *Reno, NV 1967; Verdi, NV 1982.*

NOTE: See Index Map for Legend to Abbreviations and Map Symbols.

ALTURAS TRANSMISSION LINE EIR/S

Map X-1

Alternative Segment

[Segment X East]

APPENDIX C.2

SEGMENT/STRUCTURE COORDINATE SUMMARY

Alturas 345 KV Line Coordinate Values as of 1/25/95

HZ Datum is NAD 1983 - UTM ZONE 10 - GRID

(U.S. Survey Feet)

Point #	Alternative Segment Milepost	Quad Map	Source	Northing	Easting	Elevation	From	To	Segment Grid Dist (feet)	Segment # & Length (feet)	Segment Length (Miles)
A01		Big Sage	SEA 201	15,096,039.48	2,288,168.64	5,028.50	A01	HS01	8,384.45		
HS01		Big Sage	PAPER	15,087,660.00	2,287,880.00		HS01	HA01	331.00		
HS01		Big Sage	PAPER	15,087,279.00	2,287,880.00						
HSA2		Big Sage	PAPER	15,086,682.00	2,287,880.00		HA02	HS02	331.00		
HS02		Big Sage	PAPER	15,086,682.00	2,288,280.00		HS02	ANP1	3,288.53		
ANP2		M. Ridge	SEA 451	15,088,372.74	2,291,100.61	4,905.10	ANP2	A03	4,181.39		
A03		M. Ridge	SEA 401 (N)	15,087,389.80	2,295,164.83	4,920.40	A03	A04	7,983.91		
A04		Alturas	SEA 205	15,079,634.11	2,297,060.10	4,343.60	A04	A05	6,008.41		
A05		Alturas	SEA 402 (N)	15,074,002.36	2,299,153.99	4,393.90	A05	A04	12,387.29	"A" (A1 TO C1)	
A05		Alturas	SEA 105	15,061,615.74	2,299,282.29	4,477.90	A05	C01	15,516.10	58,462.08	11.07
B01	0.00	M. Ridge	PAPER	15083138	2309437		B01	B07	720.19		
B03	0.14	M. Ridge	SEA 101	15,082,731.83	2,308,842.27	4,413.90	B02	B03	5,020.77		
B03	1.06	M. Ridge	SEA B3	15,082,561.25	2,303,824.40		B03	B04	2,372.93		
B04	1.54	Alturas	SEA B4	15,082,000.83	2,301,518.60		B04	B06	1,728.12		
B05	1.86	Alturas	SEA B5	15080273.02	2,301,551.24		B05	B06	1,115.54		
B03	2.08	Alturas	SEA B5	15,079,399.06	2,302,244.51		B06	B07	900.51		
B03	2.25	Alturas	SEA B4	15,078,498.55	2,302,245.20		B02	B06	12,474.31	"A" (B01 TO B08)	
B03	4.61	Alturas	SEA1207	15,066,388.82	2,299,251.37	4,568.00				24,332.37	4.61
C01		Alturas	SEA 403 (N)	15,046,816.96	2,294,619.06	4,757.00	C01	C02	16,628.47		

Alturas 345 KV Line Coordinate Values as of 1/25/95

HZ Datum is NAD 1983 - UTM ZONE 10 - GRID

(U.S. Survey Feet)

Point #	Alternative Segment Milepost	Quad Map	Source	Northing	Easting	Elevation	From	To	Segment Grid Dist (feet)	Segment # & Length (feet)	Segment Length (Miles)
C02		I. Cavers	SEA 107	15,031,668.66	2,301,477.27	4,948.90	C02	C03	11,691.92		
C03		I. Cavers	SEA 404 (N)	15,020,159.46	2,303,536.20	4,999.30	C03	C04	24,715.78		
C04		I. Cavers	SEA 405 (N)	14,995,961.25	2,298,504.67	5,276.20	C04	C05	17,626.93		
C05		Likely	SEA 406 (N)	14,979,772.66	2,305,478.79	5,395.20	C05	C06	11,323.10		
C06		Likely	SEA 210	14,969,461.81	2,310,158.42	5,705.20	C06	C07	8,203.87		
C07		Likely	SEA 212	14,963,370.32	2,315,653.61	5,620.10	C07	C08	8,206.98		
C08		Likely	SEA 213	14,956,369.47	2,319,936.45	5,665.00	C08	C09	6,182.78		
C09		Likely	SEA 214	14,950,610.39	2,322,185.84	5,831.80	C09	C10	5,936.13	"C" (C01 TO E01)	
C10		Likely	SEA 112	14,945,576.02	2,325,331.12	5,933.90	C10	E01	5,167.56	115,683.51	21.91
D00	0.00	Hol Cnyn	PAPER	14,945,428.00	2,325,425.00		D00	D07	18,132.12		
D01	3.43	Hol Cnyn	PAPER	14,932,114.94	2,313,115.00		D01	D02	3,546.17		
D02	4.11	Hol Cnyn	SEA 217	14,928,912.09	2,311,592.81	6,372.70	D02	D08	7,941.60		
D03	8.67	Hol Cnyn	SEA D3	14,928,631.63	2,303,656.17		D03	D04	16,178.15		
D04	8.67	Hol Cnyn	PAPER	14,912,465.47	2,304,278.97		D04	D05	2,590.15		
D05	9.16	Hol Cnyn	SEA 224	14,912,116.07	2,301,712.50	5,890.60	D05	D07	4,745.41		
D08	10.06	Hol Cnyn	PAPER	14907384	2301357		D02	D08	9,613.16	"D" (D00 TO D08)	
D08	11.88	Andsn Mtn	SEA 226	14,899,164.08	2,306,341.55	5,549.60				62,746.75	11.88
E01		Hol Cnyn	SEA 113	14,941,581.42	2,328,609.36	5,965.50	E01	E02	15,162.10		
E02		Madeline	SEA 114	14,926,783.85	2,331,914.09	6,098.10	E02	EN01	7,295.65		

Alturas 345 KV Line Coordinate Values as of 1/25/95

HZ Datum is NAD 1983 - UTM ZONE 10 - GRID

(U.S. Survey Feet)

Point #	Alternative Segment Milepost	Quad Map	Source	Northing	Easting	Elevation	From	To	Segment Grid Dist (feet)	Segment # & Length (feet)	Segment Length (Miles)
EN01		Madeline	SEA 407	14,919,488.20	2,331,018.55	5,323.00	EN01	E03	16,099.03		
E03		Madeline	SEA 115	14,903,394.46	2,332,331.64	5,292.10	F03	E04	561.81		
E04		Madeline	SEA 300 (GLO)	14,903,309.56	2,332,887.00		E04	E05	13,381.39		
E05		Mcdld Pk	SEA 408(N)	14,890,047.11	2,331,106.81	5,292.70	E05	E06	3,067.09		
E05		Mcdld Pk	SEA 409 (N)	14,886,981.53	2,331,010.55	5,324.20	E05	E07	10,650.67		
E07		Andsn Mtn	SEA 300 (GLO)	14,876,652.66	2,328,412.26	5,304.30	E07	E06	18,219.41	"E" (E01 TO E08)	
F04		Mcdld Pk	PAUL	14,860,686.15	2,337,188.21					84,437.15	15.99
D08	4.90	Andsn Mtn	SEA 226	14,899,164.08	2,306,341.55	5,549.60	D08	E07	25,849.81		
F04	4.90	Andsn Mtn	SEA 234	14,873,318.29	2,306,797.73	5,287.30	F01	E07	2,574.64		
E07	5.38	Andsn Mtn	SEA 235	14,870,746.58	2,306,675.13	5,287.60	F02	POT	5,307.64		
POT	5.38	Andsn Mtn	SEA 235	14,865,440.19	2,306,790.51	5,287.30	POT	E03	5,821.68		
F03	7.49	Andsn Mtn	SEA 452	14,859,619.88	2,306,916.93	5,286.20	F03	E04	16,280.25	"F" (D08 TO F04)	
F04	10.57	Andsn Mtn	SEA 235	14,860,000.32	2,323,192.74	5,290.90				55,834.02	10.57
							D08	G01	7,584.28		
G04	1.44	Andsn Mtn	SEA 226	14,892,013.45	2,308,869.38	5,290.90	G01	G02	4,873.03		
G02	2.36	Andsn Mtn	PAPER	14887145	2,309,080.55		G02	G03	7,883.40		
G04	3.85	Andsn Mtn	PAPER	14887052	2,316,963.40		G04	G05	5,308.14		
G05	4.90	Andsn Mtn	SEA 232	14,886,979.60	2,322,271.05	5,289.40	G06	G05	10,456.77	"G" (D08 TO F04)	
G05	6.84	Andsn Mtn	SEA 233	14,876,526.44	2,322,545.88	5,289.10	G06	F04	16,538.78	52,644.40	9.97
F04	9.97									"H" (F04 TO J01)	

Alturas 345 KV Line Coordinate Values as of 1/25/95

HZ Datum is NAD 1983 - UTM ZONE 10 - GRID

(U.S. Survey Feet)

Point #	Alternative Segment Milepost	Quad Map	Source	Northing	Easting	Elevation	From	To	Segment Grid Dist (feet)	Segment # & Length (feet)	Segment Length (Miles)
							F04	J01	328.67	328.67	0.06
										"I"	
I01	0.18	Andsn Mtn	SEA 240	14,860,133.51	2,336,401.07	5,292.60	J01	I01	13,205.41	(E08 TO J01)	
J01	2.68						I01	E08	961.77	14,167.18	2.68
J01	0.00	Clghn Flat	SEA 1418	14,859,671.84	2,323,203.73		J01	J02	5,041.00		
J02	0.95	Clghn Flat	SEA 242	14,854,633.66	2,323,372.35	5,292.30	J02	J03	6,165.79		
J03	2.12	Clghn Flat	SEA 243	14,848,467.87	2,323,370.34	5,401.60	J03	J04	14,043.28		
J04	4.78	Clghn Flat	SEA 244	14,834,841.20	2,326,765.57	5,455.00	J04	J05	10,193.23		
J05	6.71	Clghn Flat	SEA 245	14,825,558.48	2,330,976.64	6,278.80	J05	J06	18,664.19		
J06	10.25	Termo	SEA 246	14,810,164.30	2,341,529.89	5,584.10	J06	J01	13,100.76		
J07	12.73	W. Snstm Mtn	SEA 246	14,802,410.54	2,352,089.68	5,899.40	J07	JN07	6,298.35		
										"J"	
JN07	13.92	W. Snstm Mtn	SEA 910	14,799,368.11	2,357,604.47	5,854.50	JN07	JN08	13,607.41	(J01 TO JN08)	
JN07	16.50	W. Snstm Mtn	SEA 902	14,793,021.44	2,369,641.14	5,388.30				87,114.02	16.50
							E08	K01	3,442.79		
K04		Termo	SEA 305 (GLO)	14,857,669.09	2,338,846.56	5,293.50	K01	K02	5,420.39		
K02		Termo	SEA 305 (GLO)	14,853,418.20	2,342,209.67	5,304.50	K02	K03	19,561.75		
K03		Termo	SEA 410 (N)	14,840,081.98	2,356,520.76	5,298.70	K03	K04	1,825.47		
K04		Termo	SEA 410 (N)	14,838,725.48	2,355,299.18	5,355.00	K04	K05	12,328.80		
										"K"	
K05		Termo	SEA 251	14,830,217.36	2,364,221.69	5,341.00	K05	K06	11,341.33	(K01 TO J08)	
K06		Ravndle	SEA 250	14,819,888.20	2,368,905.07	5,380.60	K06	J08	27,489.07	81,409.59	15.42

	Alturas 345 KV Line Coordinate Values as of 1/25/95 HZ Datum is NAD 1983 - UTM ZONE 10 - GRID (U.S. Survey Feet)										
Point #	Alternative Segment Milepost	Quad Map	Source	Northing	Easting	Elevation	From	To	Segment Grid Dist (feet)	Segment # & Length (feet)	Segment Length (Miles)
L04		Sntrm Mtn	SEA 901	14,792,414.24	2,369,816.49	5,388.80	J08	L00	8,973.80		
L04		W. Snstm Mtn	SEA 609	14,787,559.97	2,377,364.02	5,523.60	L00	L01	17,073.11		
L04		Sntrm Mtn	SEA 254	14,778,487.74	2,391,827.27	5,167.10	L01	L00	5,757.13		
L02		Sntrm Mtn	SEA 255	14,777,976.08	2,397,561.62	5,243.30	L02	L03	10,891.88		
L03		Shnn Mtn	SEA 313 (GLO)	14,769,696.08	2,404,637.97	4,860.10	L03	L00	9,097.02		
L04		5 Springs	SEA 314 (GLO)	14,761,169.38	2,407,808.32	4,638.90	L04	L05	10,124.89		
L04		5 Springs	SEA 316 (GLO)	14,751,484.34	2,404,856.49	4,490.30	L06	L00	12,373.59		
L08		Karlo	SEA 316 (GLO)	14,739,324.26	2,402,567.80	4,449.50	L06	L00	29,301.55		
L07		Shffr Mtn	SEA 314 (GLO)	14,710,304.18	2,398,516.18	4,419.20	L07	LN09	11,446.91		
LN09		Shffr Mtn	SEA 314 (GLO)	14,699,044.53	2,400,578.22	4,531.00	LN09	L08	14,678.22	"L" (J08 TO L08)	
L08		Shffr Mtn	SEA 1257	14,684,791.66	2,404,086.22	4,389.60				129,718.10	24.57
							L01	LN01	11,480.40		
LN04	2.17	Shnn Mtn	SEA 609	14,778,858.20	2,403,301.69	5,499.50	LN01	LN02	16,535.88		
LN02	5.31	Shnn Mtn	SEA 1027	14,768,997.82	2,416,576.04	5,300.50	LN02	LN03	17,415.65		
LN09	8.60	5 Springs	SEA 1000	14,752,032.68	2,412,640.44	4,577.40	LN09	LN04	6,234.61		
LN04	9.79	5 Springs	SEA 609	14,745,798.14	2,412,611.52	4,462.20	LN04	LN09	2,942.94		
LN05	10.34	5 Springs	SEA 1015	14,743,639.37	2,414,611.67	4,445.90	LN09	LN09	26,990.70		
LN05	15.45	L. Mud Flt	SEA 1008	14,716,665.29	2,415,558.69	4,561.20	LN06	LN01	8,645.92		
LN04	17.09	L. Mud Flt	SEA 905	14,711,149.15	2,408,901.05	4,436.20	LN07	N02	30,931.72	"LN" (L01 TO N02)	
N02	22.95									121,177.82	22.95

Alturas 345 KV Line Coordinate Values as of 1/25/95

HZ Datum is NAD 1983 - UTM ZONE 10 - GRID

(U.S. Survey Feet)

Point #	Alternative Segment Milepost	Quad Map	Source	Northing	Easting	Elevation	From	To	Segment Grid Dist (feet)	Segment # & Length (feet)	Segment Length (Miles)
							L08	M01	9,586.23		
M01	1.82	L. Mud Flt	SEA 259	14,675,538.13	2,406,589.79	4,089.80	M01	M02	5,600.18		
										"M"	
M02	2.88	Wendel	SEA 265	14,672,327.34	2,411,178.13	4,099.70	M02	M03	3,808.09	(L08 TO M03)	
M03	3.60	Wendel	SEA 412 (N)	14,672,531.79	2,414,980.73	4,149.00				18,994.51	3.60
							L08	N01	3,658.32		
										"N"	
N01		L. Mud Flt	SEA 258	14,683,226.90	2,407,393.00	4,312.20	N01	N02	4,054.35	(L08 TO M03)	
N02		L. Mud Flt	SEA 260	14,680,242.13	2,410,136.88	4,257.00	N02	M03	9,105.61	16,818.28	3.19
							M03	O01	7,708.34		
O01		Wendel	SEA 262	14,667,286.86	2,420,629.55	4,082.90	O01	O02	11,134.55		
O02		Wendel	SEA 263	14,656,161.63	2,421,085.12	4,002.90	O02	O03	12,012.39		
O03		Wendel	SEA 264	14,647,271.32	2,429,163.47	4,012.60	O03	O04	31,339.74		
										"O"	
O04		Spncr Crk	SEA 141	14,632,631.82	2,456,873.83	4,023.80	O04	O05	30,538.55	(M03 TO O05)	
O05		Calneve	SEA 413 (N)	14,602,098.81	2,457,455.79	4,030.20				92,733.57	17.56
							O05	P01	21,753.57		
P01	4.12	Doyle	SEA 268	14,580,347.35	2,457,758.42	4,247.20	P01	P02	7,397.15		
P02	5.52	Doyle	SEA 264	14,572,961.11	2,458,159.98	4,803.00	P02	P03	10,629.88		
P03	7.53	Doyle	SEA 268	14,562,624.65	2,460,640.31	4,816.80	P03	P04	8,124.48		
P01	9.07	Doyle	SEA 268	14,554,952.53	2,463,313.48	4,812.30	P04	P05	10,350.19		
P05	11.03	Doyle	SEA 270	14,544,602.98	2,463,427.66	4,487.00	P06	P05	10,039.04		
P05	12.93	Cnstntia	SEA 271	14,536,486.07	2,469,335.12	4,325.20	P06	P01	8,161.16		

Alturas 345 KV Line Coordinate Values as of 1/25/95
HZ Datum is NAD 1983 - UTM ZONE 10 - GRID
(U.S. Survey Feet)

Point #	Alternative Segment Milepost	Quad Map	Source	Northing	Easting	Elevation	From	To	Segment Grid Dist (feet)	Segment # & Length (feet)	Segment Length (Miles)
P07	14.48	Cnstntia	SEA 272	14,530,497.94	2,474,880.10	4,365.60	P07	P08	10,199.24		
										"P"	
P08	16.41	Cnstntia	SEA 273	14,520,649.57	2,477,532.29	4,479.20	P08	P09	6,121.80	(Q05 TO P09)	
P09	17.57	Cnstntia	SEA 148	14,514,615.79	2,476,497.93	4,502.60				92,776.51	17.57
							Q05	Q01	35,771.51		
Q01		St. Line	SEA 143	14,574,489.89	2,480,201.09	3,986.00	Q01	Q02	21,996.74		
Q02		St. Line	SEA 144	14,558,553.41	2,495,363.06	5,103.90	Q02	Q03	3,539.84		
Q03		St. Line	SEA 145	14,555,154.63	2,496,352.40	5,207.40	Q03	Q04	2,852.10		
										"R"	
Q04		St. Line	SEA 145	14,553,203.21	2,498,432.40	5,397.00	Q04	Q05	19,647.04	(Q05 TO Q01)	
Q05		7 Lakes	SEA 454	14,533,741.93	2,495,737.07	4,920.70	Q05	P08	27,128.47	110,935.70	21.01
							P08	R01	1,847.26		
										"R"	
R01		Cnstntia	SEA149	14,512,771.31	2,476,599.20	4,575.80	R01	R02	3,213.00	(P09 TO R02)	
R02		Cnstntia	PAUL	14,509,804.89	2,477,833.61					5,060.26	0.96
							R02	S01	6,076.38		
										"S"	
S01	1.15	Cnstntia	SEA 274	14,505,701.18	2,473,352.32	4,795.60	S01	S02	11,280.25	(R02 TO SN01)	
S02	3.29	Cnstntia	SEA 275	14,495,459.47	2,468,624.60	4,743.40	S02	SN01	2,946.71	20,303.34	3.85
SN01	3.85										
							R02	T01	4,796.42		
										"R"	
T01		Cnstntia	SEA 151	14,505,376.57	2,479,676.35	4,721.00	T01	T02	18,425.16		
T02		Bckwrth	SEA 152	14,487,409.53	2,475,593.21	4,882.90	T02	W01	6,623.27	29,844.85	5.65
										"U"	
SN01	0.00	Bckwrth	SEA 1409	14,492,608.20	2,469,368.50		SN01	WN01	11,053.29	(SN01 TO WN01)	

	Alturas 345 KV Line Coordinate Values as of 1/25/95										
	HZ Datum is NAD 1983 - UTM ZONE 10 - GRID										
	(U.S. Survey Feat)										
	Alternative								Segmant	Segment #	Segment
	Segment								Grid	& Length	Length
Point #	Milepost	Quad Map	Source	Northing	Easting	Elevation	From	To	Dist (feet)	(feet)	(Miles)
WN01	2.09	Bckwrth	SEA 415 (N)	14,483,635.21	2,475,823.01	4,888.50				11,053.29	2.09
W01	0.00	Bckwrth	SEA 153	14,480,798.49	2,475,995.33	5,005.60	W01	WN02	10,236.00		
WN02	1.94	Bckwrth	SEA 455	14,470,997.38	2,478,947.29	5,253.70	WN02	WN03	4,964.40		
										"Z"	
WN03	2.88	Bckwrth	SEA 456	14,466,033.18	2,478,991.95	5,495.90	WN03	WN04	8,328.89	(W01 TO WN02)	
WN04	4.46	Bckwrth	SEA 457	14,457,959.31	2,476,946.72	5,216.30				23,529.29	4.46
WN05	0.00	Evns Cnyn	SEA 1403	14,436,772.00	2,476,600.25	5,167.70	WN05	WN06	9,612.67		
WN06	1.82	Evns Cnyn	SEA 1404	14,428,018.00	2,480,571.50	5,121.90	WN06	WN07	5,293.23		
WN07	2.82	Evns Cnyn	SEA 1405	14,423,692.00	2,483,621.75	5,192.70	WN07	WN08	1,077.94		
WN09	3.03	Evns Cnyn	SEA 1406	14,422,863.00	2,482,932.75	5,092.10	WN08	WN09	2,492.11		
WN09	3.50	Evns Cnyn	SEA 1407	14,420,702.00	2,484,174.00	5,130.50	WN08	WN10	2,160.37	"WCFG"	
WN10	3.91	Evns Cnyn	SEA 1408	14,418,542.00	2,484,214.00	5,147.80	WN10	BS01	1,618.65	22,254.97	4.21
BS01	4.21										
W01		Bckwrth	SEA 153	14,480,798.49	2,475,995.33	5,005.60	W01	W02	13,576.80		
W02		Bckwrth	SEA 154	14,467,266.66	2,477,099.43	5,370.40	W02	WN05	30,498.74		
WN09		Evns Cnyn	SEA 1408	14,436,772.00	2,476,600.25	5,167.70	WN05	W03	3,847.58		
W03		Evns Cnyn	SEA 415 (N)	14,432,924.72	2,476,648.48	5,206.70	W03	V05	11,038.25		
										"W"	
V05		Evns Cnyn	SEA 414 (N)	14,422,294.95	2,479,623.55	5,237.60	V05	BS01	6,440.00	(W01 TO BS01)	
BS01		Evns Cnyn	PAPER	14,417,115.00	2,483,450.00					65,401.38	12.39
BS02		Evns Cnyn	PAPER	14416108	2,483,558.00		BS01	BS02	1,012.77		

Alturas 345 KV Line Coordinate Values as of 1/25/95

HZ Datum is NAD 1983 - UTM ZONE 10 - GRID

(U.S. Survey Feet)

Point #	Alternative Segment Milepost	Quad Map	Source	Northing	Easting	Elevation	From	To	Segment Grid Dist (feet)	Segment # & Length (feet)	Segment Length (Miles)
BSA1		Evns Cnyn	PAPER	14415859	2,483,585.00		BS02	BSA1	250.46		
BSA2		Evns Cnyn	PAPER	14415859	2,483,745.00		BSA2	BS03	347.38		
										"BS"	
BS03		Evns Cnyn	PAPER	14415345	2,484,088.00		BS03	BS04	1,593.46	(BS01 TO X01)	
BS04		Evns Cnyn	PAPER	14413760	2,484,252.00		BS04	X01	984.93	4,189.00	0.79
X01		Evns Cnyn	SEA 417 (N)	14,412,807.30	2,484,501.88	5,199.90	X01	X02	2,390.80		
X02		Reno NW	SEA 163	14,411,278.67	2,486,340.14	5,282.70	X02	X03	5,094.47		
X05		Reno NW	SEA 1412	14,406,788.61	2,488,747.02	5,333.99	X03	X04	3,321.73		
X04		Reno NW	SEA 1413	14,406,519.50	2,492,057.83	5,348.96	X04	X05	1,511.24		
X05		Reno NW	SEA 1414	14,407,317.43	2,493,341.25	5,384.16	X03	X04	2,353.89		
X05		Reno NW	SEA 1415	14,407,214.47	2,495,692.89	5,406.64	X03	X04	8,561.03		
										"X1"	
X05		Verdi	SEA 162	14,403,077.90	2,503,188.22	5,870.60	X07	X08	20,895.43	(X01 TO X09)	
X05		Reno	SEA 163	14,393,916.61	2,521,968.25	5,617.50	X04	X08	2,112.91	46,241.50	8.76
X05	0.00	Reno	BUD	14,392,784.38	2,523,752.19	5,591.63	X03	X10	3,433.75		
										"X2"	
X10	0.00	Reno	SEA 164	14,390,944.36	2,526,651.33	5,546.90	X10	X11	3,302.87	(X09 TO X12)	
X11	1.28	Reno	BUD	14,388,799.40	2,529,162.91	5,399.09	X11	X12	5,314.96	12,051.58	2.28
X10		Reno	BUD	14,383,488.30	2,529,365.40	5,326.73	X12	X13	11,069.05		
										"X3"	
X10		Reno	BUD	14,384,152.37	2,540,414.51	5,004.63	X13	X14	2,156.30	(X12 TO X14)	
X04		Reno	BUD	14,381,996.78	2,540,469.67	4,775.22				13,225.34	2.50
										"Y"	

	Altures 345 KV Line Coordinete Values as of 1/25/95										
	HZ Datum is NAD 1983 - UTM ZONE 10 - GRID										
	(U.S. Survey Feet)										
	Alternetive								Segment	Segment #	Segment
	Segment								Grid	& Length	Length
Point #	Milepost	Qued Mep	Source	Northing	Eesting	Elevetion	From	To	Dist (feet)	(feet)	(Miles)
							X09	Y01	9,880.99	(X09 TO X12)	
Y01		Reno	BUD	14,383,868.98	2,528,012.42	5,397.41	Y01	X12	1,405.51	11,286.50	2.14

Climate and Air Pollution Meteorology

The most important climatic and meteorological characteristics influencing air quality in the study area are the persistent temperature inversion, topography, and prevalent sunlight.

Temperature Inversions. Atmospheric stability is a primary factor affecting air quality. Atmospheric stability regulates the amount of air exchange (referred to as mixing) both horizontally and vertically. Restricted mixing (that is, a high degree of stability) and low wind speeds are generally associated with higher pollutant concentrations. These conditions are typically related to temperature inversions that cap the pollutants emitted below or within them. An inversion is characterized by a layer of warmer air above the cooler air nearer the ground surface. Normally, air temperature decreases with altitude. In an inversion, the temperature of an air layer increases more rapidly with altitude than is normal. The inversion acts like a lid on the cooler air mass near the ground, preventing pollutants in the lower air mass from dispersing upward beyond the inversion "lid." This results in higher concentrations of pollutants trapped below the inversion.

Wind and Topography. The airflow in this area plays an important role in the movement of pollutants. Wind speeds typical of the region are generally light, another factor that tends to cause higher levels of pollution, since low wind speeds minimize dispersion of pollutants. In general, winds in the winter flow in a southeast direction, while in the summer they flow in a northwest pattern.

Local topography plays a significant role in direction and speed of winds in the areas of the Proposed alignment. Daytime winds flow predominately in the directions described above. Air parcels in the evening cool, get heavier, and flow down the cascade mountains and mountain valleys. This diurnal effect can further aggravate pollution by continually recycling an air mass over pollution sources. This effect is more pronounced during periods when wind speeds are low.

Sunlight and Temperature. Sunlight drives the photochemical reactions that produce ozone and other photochemical pollutants. This is a concern in the Truckee Meadow Air Basin, but not elsewhere along the transmission line route. The essentials of ozone photochemistry are as follows: hydrocarbon and nitrogen oxides pollutants released during the night and early morning hours react under the stimulative action of ultraviolet light in sunlight; the reaction continues as additional pollutants are picked up by individual parcels of air as they move downwind; the ozone level peaks in the early afternoon; and thereafter ozone is used up in other atmospheric reactions.

Computations of Onsite Construction Emissions

Exhaust Emission Factors

Table A-1 lists exhaust emission factors for calculating emissions from constructing the Proposed Alturas Transmission Line. Upon inspection, the rows for many types of equipment are seen to have identical emission factors. This is because they are based upon a limited set of EPA construction equipment types in document AP-42 (EPA, 1985, and 1990). The list was expanded to simplify the selection of emission factors for equipment that are described in the Project Description in Part B. California Air Resources Board (CARB) Profile 561 was used to characterize diesel reactive organic compounds (ROC) at 95 percent of total hydrocarbon (THC), and Profile 502 to characterize light-duty non-catalyst gasoline reactive organic gases (ROC) at 91 percent of THC.

Table A-1 Emission Factors for Construction Equipment

EXHAUST EMISSION FACTORS (pounds/1000 gallons of fuel)								
Equipment	THC	ROC	NOx	SO_2	CO	TSP	PM_{10}	References
Air Compressor	44.5	42.7	469	31.2	102	33.5	31.83	2,3,4
Auger	44.5	42.7	469	31.2	102	33.5	31.83	2,3,4
Backhoe	74.9	71.7	436.7	31.2	268.5	46.5	44.18	1,3,4
Dozer, D-6	33.8	32.4	284.9	31.2	78.5	25.3	23.6	1,3,4
Dozer, D-8	33.8	32.4	284.9	31.2	78.5	25.3	23.6	1,3,4
Dump Truck	20.9	20.24	286.1	31.2	123.5	17.7	16.8	1,3,4
Flatbed Truck	20.9	20.24	286.1	31.2	123.5	17.7	16.8	1,3,4
Hoe, 710 J.D.	74.9	71.67	436.7	31.2	268.5	46.5	44.18	1,3,4
Hydraulic Crane	40.5	38.8	469	31.1	153.5	30.1	28.6	1,3,4
Materials Rig	20.9	20.24	286.1	31.2	123.5	17.7	16.8	1,3,4
Pickup Truck	134.6	122.9	95.8	5.3	3960	6.1	6.0	1,3,4
Puller Truck	20.9	20.2	286.1	31.2	123.5	6.1	6.0	1,3,4
Tensioner	20.9	20.2	286.1	31.2	123.5	17.7	16.82	1,3,4
Welding Rig	40.5	38.8	368	31.1	153.5	30.1	28.6	1,3,4

Data sources:
1.) U.S. EPA, 1985. Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources.
2.) U.S. EPA, 1990. Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources.
3.) California ARB, 1991. Identification of Volatile Organic Compound Species Profiles.
4.) California ARB, 1988. Method Used to Develop a Size-Segregated Particulate Matter Inventory (Draft).

Abbreviations:
THC - total hydrocarbons, ROC - reactive organic compounds, NOx - nitrogen oxides, SO_2. CO - carbon monoxide, TSP - total suspended particulates, PM_{10} - fine particulate matter.

Transmission Line Construction Emissions. Construction exhaust emissions were calculated by determining the maximum amount of equipment that would be required for each construction activity and the maximum expenditures in time, fuel and material. Exhaust emissions were calculated by summing total equipment usage hours for each type of equipment. This consisted in taking the product of pieces of equipment, construction hours per day, and a usage factor representing the fraction of a work day on

average that the equipment would be used. The total usage hours is then multiplied by fuel consumption rate and then by the equipment emission factor to obtain emisions for that equipment type.

Estimates of fugitive total suspended particulates (TSP) were based on the AP-42 factor of 1.2 tons per acre per month (EPA, 1990, Section 11.2.4) without assuming dust control watering effectiveness. The fine particulate emission factor assumes 64 percent of the TSP is inhalable, fine particulates (PM_{10}), as based on CARB Profile 391--Road and Building Construction Dust in (CARB, 1988). The maximum daily fugitive dust emission calculation was based on assuming the largest area that would feasibly be disturbed during each construction activity. These areas ranged from 0.17 to 12.12 acres.

Substation Construction Emissions

Estimates of emissions in constructing substations consisted of three activities: grading, footings and foundations, and equipment installation. The emissions from equipment usage and site preparation activities were calculated using the emission factors and methodologies described above.

Computations of Offsite Vehicle Emissions.

Commuting emissions were computed using California emission factors compiled in the South Coast Air Quality CEQA Handbook for inland areas for light duty vehicles at an average speed of 40 mph, and an average round trip distance of 40 miles. Based on construction activities, the number of vehicles ranged from 4 to 40.

Offsite emissions from materials delivery to staging areas and construction sites were based on exhaust emission factors in Table A-1 for flatbed trucks. This was based on a maximum of 12 flatbed trucks running 4 hours per day at a usage factor of 80 percent. Additional, but lesser emissions were computed from use of light duty pickup trucks. The usage depended on the site and construction activity.

Vehicle Emissions During Operations

The sources of vehicular emissions after construction for maintenance and inspections consist of:

- Patrols using light duty trucks (LDT)
- Climbing and inspections using heavy duty trucks (HDT)
- Pole (structure) testing using HDT
- Anchor testing using HDT
- Right-of-way maintenance using HDT
- Repair of the transmission line using HDT

The emission estimates are based on the emission factors in the South Coast CEQA Handbook (SCAQMD, 1994) for LDT and HDT vehicles in the inland temperature regime (AREA 3). Vehicle speeds ranged between 25 to 50 mph, and distances ranged from 30 to 150 miles round trip.

Emissions Calculations

The following pages consist of printouts of the spreadsheets of emissions computations as described above.

REFERENCES

CARB/ California Air Resources Board. 1988. *Method Used to Develop a Size-Segregated Particulate Matter Inventory (Draft).*

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Table A-2 CONSTRUCTION EMISSIONS

ROW CONSTRUCTION AND ACCESS ROAD PREPARATION

Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Fuel Usage
Diesel:								
Dozer D-8	400	12	2	8	16	90	14.4	172.8
Gasoline:								
Pickup Truck	150	2	2	2	4	90	3.6	7.2

Total Construction Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Dozer D-8	5.84	5.61	49.23	5.39	13.56	4.37	4.15
Gasoline:							
Pickup Truck	0.97	0.88	0.69	0.04	28.51	0.04	0.04
Fugitive Dust						969.60	620.54
Commute	0.101	0.092	0.201	0.021	1.400	0.039	0.039
Total	6.91	6.58	50.12	5.45	43.48	974.05	624.78

Table A-3 CONSTRUCTION EMISSIONS

WIRE SETUP SITES
Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel
Diesel:								
Dozer D-6	165	6	1	4	4	80	3.2	19.2
Flatbed Truck	170	5	1	8	8	90	7.2	36
Gasoline:								
Pickup Truck	150	2	2	4	8	50	4	8

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Dozer D-6	0.65	0.62	5.47	0.60	1.51	0.49	0.46
Flatbed Truck	0.75	0.73	10.30	1.12	4.44	0.64	0.60
Gasoline:							
Pickup Truck	1.08	0.98	0.77	0.04	31.68	0.05	0.05
Fugitive Dust						13.60	8.70
Commute	0.15	0.14	0.30	0.03	2.10	0.06	0.06
Total	2.63	2.47	16.84	1.80	39.73	14.83	9.88

Table A-4 CONSTRUCTION EMISSIONS

STRUCTURE EXCAVATION (Pole Excavation, Anchor Installation, Anchor Testing)
Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel Usage
Diesel:								
Auger	165	5	1	8	8	80	6.4	32
Hoe, 710 J.D.	115	5	1	8	8	80	6.4	32
Gasoline:								
Pickup Truck	150	2	2	4	8	50	4	8

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Auger	1.43	1.37	15.01	1.00	3.26	1.07	1.02
Hoe, 710 J.D.	2.40	2.29	13.97	1.00	8.59	1.49	1.41
Gasoline:							
Pickup Truck	1.08	0.98	0.77	0.04	31.68	0.05	0.05
Fugitive Dust						13.6	8.704
Commute	0.24	0.23	0.50	0.05	3.50	0.10	0.10
Total	5.14	4.87	30.25	2.09	47.04	16.31	11.28

Table A-5 CONSTRUCTION EMISSIONS

Material Delivery

Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel Usage
Diesel:								
Flat Bed Truck	170	5	12	4	48	80	38.4	192
Gasoline:								
Pickup Truck	150	2	7	6	42	80	33.6	67.2

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Flat Bed Truck	4.01	3.89	54.93	5.99	23.70	3.40	3.23
Gasoline:							
Pickup Truck	9.05	8.26	6.44	0.36	266.11	0.41	0.40

Commute	0.976	0.917	2.011	0.212	14.004	0.390	0.388

Total	14.03	13.06	63.38	6.56	303.82	4.20	4.02

Table A-6 CONSTRUCTION EMISSIONS

STRUCTURE ASSEMBLY (AFTER THE STRUCTURE EXCAVATION)
Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel Usage
Diesel:								
Flat bed truck	170	5	2	8	16	80	12.8	64
Hydraulic Crane	165	6	1	8	8	70	5.6	33.6
Gasoline:								
Pickup Truck	150	2	2	4	8	50	4	8

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Flat bed truck	1.34	1.30	18.31	2.00	7.90	1.13	1.08
Hydraulic Crane	1.36	1.30	12.37	1.04	5.16	1.01	0.96
Gasoline:							
Pickup Truck	1.08	0.98	0.77	0.04	31.68	0.05	0.05
Fugitive Dust						13.60	8.70
Commute	0.24	0.23	0.50	0.05	3.50	0.10	0.10
Total	4.02	3.81	31.94	3.14	48.24	15.89	10.89

Table A-7 CONSTRUCTION EMISSIONS

Structure Erection

Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel Usage
Diesel:								
Hydraulic Crane	165	6	1	8	8	90	7.2	43.2
Gasoline:								
Pickup Truck	150	2	2	8	16	50	8	16

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Hydraulic Crane	1.75	1.68	15.90	1.34	6.63	1.30	1.24
Gasoline:							
Pickup Truck	2.15	1.97	1.53	0.08	63.36	0.10	0.10
Fugitive Dust						13.6	8.704
Commute	0.366	0.344	0.754	0.079	5.251	0.146	0.146
Total	4.27	3.99	18.18	1.51	75.24	15.14	10.18

Table A-8 CONSTRUCTION EMISSIONS

Wire Installation

Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel Usage
Diesel:								
Tensionser	165	5	1	5	5	90	4.5	22.5
D-6 Dozer	170	5	1	5	5	90	4.5	22.5
Puller Truck	165	5	2	5	10	80	8	40
Gasoline:								
Pickup Truck	150	2	6	8	48	70	33.6	67.2

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Tensionser	0.47	0.46	6.44	0.70	2.78	0.40	0.38
D-6 Dozer	0.76	0.73	6.41	0.70	1.77	0.57	0.54
Puller Truck	0.84	0.81	11.44	1.25	4.94	0.71	0.67
Gasoline:							
Pickup Truck	9.05	8.26	6.44	0.36	266.11	0.41	0.40
Fugitive Dust						584	373.76
Commute	0.683	0.642	1.407	0.148	9.802	0.273	0.272
Total	11.80	10.90	32.14	3.16	285.40	586.36	376.03

Table A-9 CONSTRUCTION EMISSIONS

Clean Up

Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel Usage
Diesel:								
Dump Truck	170	5	2	8	16	85	13.6	68
D-6 Dozer	165	6	1	4	4	60	2.4	14.4
Gasoline:								
Pickup Truck	150	2	2	8	16	80	12.8	25.6

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Dump Truck	1.42	1.38	19.45	2.12	8.40	1.20	1.14
D-6 Dozer	0.58	0.56	5.30	0.45	2.21	0.43	0.41
Gasoline:							
Pickup Truck	3.45	3.15	2.45	0.14	101.38	0.16	0.15
Fugitive Dust						13.6	8.704
Commute	0.098	0.092	0.201	0.021	1.400	0.039	0.039
Total	5.55	5.17	27.41	2.73	113.38	15.43	10.45

Table A-10 CONSTRUCTION EMISSIONS

Restoration

Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel Usage
Diesel:								
Flat Bed Truck	170	5	1	8	8	85	6.8	34
D-6 Dozer	165	6	1	6	6	60	3.6	21.6
Gasoline:								
Pickup Truck	150	2	2	8	16	85	13.6	27.2

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Flat Bed Truck	0.71	0.69	9.73	1.06	4.20	0.60	0.57
D-6 Dozer	0.87	0.84	7.95	0.67	3.32	0.65	0.62
Gasoline:							
Pickup Truck	3.66	3.34	2.61	0.14	107.71	0.17	0.16
Fugitive Dust						13.6	8.704
Commute	0.098	0.092	0.201	0.021	1.400	0.039	0.039
Total	5.34	4.96	20.48	1.90	116.63	15.06	10.10

Table A-11 CONSTRUCTION EMISSIONS

Substation Construction (New) - Grading

Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel Usage
Diesel:								
Dump Truck	170	5	1	8	8	90	7.2	36
D-6 Dozer	165	6	1	8	8	90	7.2	43.2
D-8 Dozer	400	12	1	8	8	90	7.2	86.4
Gasoline:								
Pickup Truck	150	2	1	8	8	50	4	8

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Dump Truck	0.75	0.73	10.30	1.12	4.44	0.64	0.61
D-6 Dozer	1.46	1.40	12.31	1.35	3.39	1.09	1.04
D-8 Dozer	2.92	2.80	24.62	2.70	6.78	2.19	2.08
Gasoline:							
Pickup Truck	1.08	0.98	0.77	0.04	31.68	0.05	0.05
Fugitive Dust						640	409.6
Commute	1.098	1.032	2.262	0.238	15.754	0.439	0.437
Total	7.31	6.95	50.25	5.45	62.05	644.40	413.81

Table A-12 CONSTRUCTION EMISSIONS

Substation Construction (New) - Footing Construction

Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel Usage
Diesel:								
Dump Truck	115	5	1	8	8	80	6.4	32
D-6 Dozer	170	5	1	8	8	85	6.8	34
Backhoe	165	6	1	8	8	60	4.8	28.8
Gasoline:								
Pickup Truck	150	2	1	8	8	50	4	8

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Dump Truck	0.67	0.65	9.16	1.00	3.95	0.57	0.54
D-6 Dozer	1.15	1.10	9.69	1.06	2.67	0.86	0.82
Backhoe	2.16	2.06	12.58	0.90	7.73	1.34	1.27
Gasoline:							
Pickup Truck	1.08	0.98	0.77	0.04	31.68	0.05	0.05
Fugitive Dust						640	409.6
Commute	0.732	0.688	1.508	0.159	10.503	0.293	0.291
Total	5.78	5.49	33.69	3.16	56.54	643.11	412.57

Table A-13 CONSTRUCTION EMISSIONS

Substation Construction (New) - Equipment Installation

Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel Usage
Diesel:								
Air Compressor	78	3	2	8	16	85	13.6	40.8
Welding Rig	40	3	2	8	16	85	13.6	40.8
Materials Rig.	80	2	1	8	8	80	6.4	12.8
Gasoline:								
Pickup Truck	150	2	2	8	16	65	10.4	20.8

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Air Compressor	1.82	1.74	19.14	1.27	4.16	1.37	1.30
Welding Rig	1.65	1.58	15.01	1.27	6.26	1.23	1.17
Materials Rig.	0.27	0.26	3.66	0.40	1.58	0.23	0.22
Gasoline:							
Pickup Truck	2.80	2.56	1.99	0.11	82.37	0.13	0.12
Commute	0.732	0.688	1.508	0.159	10.503	0.293	0.291
Total	7.27	6.83	41.31	3.21	104.88	3.24	3.10

Table A-14 CONSTRUCTION EMISSIONS

Substation Expansion - Grading

Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel Usage
Diesel:								
Dump Truck	170	5	1	5	5	80	4	20
D-6 Dozer	165	6	2	8	16	90	14.4	86.4
Gasoline:								
Pickup Truck	150	2	1	8	8	50	4	8

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Dump Truck	0.42	0.40	5.72	0.62	2.47	0.35	0.34
D-6 Dozer	2.92	2.80	24.62	2.70	6.78	2.19	2.08
Gasoline:							
Pickup Truck	1.08	0.98	0.77	0.04	31.68	0.05	0.05
Fugitive Dust						80	51.2
Commute	0.366	0.344	0.754	0.079	5.251	0.146	0.146
Total	4.78	4.53	31.86	3.44	46.18	82.74	53.81

Table A-15 CONSTRUCTION EMISSIONS

Substation Expansion - Footing Construction

Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel Usage
Diesel:								
Dump Truck	115	5	1	4	4	80	3.2	16
D-6 Dozer	170	5	1	4	4	85	3.4	17
Backhoe	165	6	1	4	4	60	2.4	14.4
Gasoline:								
Pickup Truck	150	2	1	8	8	50	4	8

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Dump Truck	0.33	0.32	4.58	0.50	1.98	0.28	0.27
D-6 Dozer	0.57	0.55	4.84	0.53	1.33	0.43	0.41
Backhoe	1.08	1.03	6.29	0.45	3.87	0.67	0.64
Gasoline:							
Pickup Truck	1.08	0.98	0.77	0.04	31.68	0.05	0.05
Fugitive Dust						80	51.2
Commute	0.366	0.344	0.754	0.079	5.251	0.146	0.146
Total	3.43	3.23	17.23	1.60	44.11	81.58	52.71

Table A-16 CONSTRUCTION EMISSIONS

Substation Expansion - Equipment Installation

Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel Usage
Diesel:								
Air Compresso	78	3	2	8	16	85	13.6	40.8
Welding Rig	40	3	2	8	16	85	13.6	40.8
Materials Rig.	80	2	1	8	8	80	6.4	12.8
Gasoline:								
Pickup Truck	150	2	2	8	16	65	10.4	20.8

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Air Compresso	1.82	0.83	19.14	1.27	4.16	1.37	1.30
Welding Rig	1.65	1.58	15.01	1.27	6.26	1.23	1.17
Materials Rig.	0.27	0.26	3.66	0.40	1.58	0.23	0.22
Gasoline:							
Pickup Truck	2.80	2.56	1.99	0.11	82.37	0.13	0.12

Commute	0.366	0.344	0.754	0.079	5.251	0.146	0.146

Total	6.90	5.57	40.56	3.13	99.62	3.09	2.95

Table A-17 CONSTRUCTION EMISSIONS

Staging Areas

Maximum Emissions/Day

Equipment	Power Rating (hp)	Fuel Use (gph)	No.	Hours	Total Hours	Usage Factor	Adjusted Hours	Total Fuel Usage
Diesel:								
Dump Truck	170	5	1	6	6	60	3.6	18
D-8 Dozer	400	12	1	8	8	90	7.2	86.4
Gasoline:								
Pickup Truck	150	2	1	8	8	50	4	8

Total Emissions (lbs/day)

	THC	ROC	NOx	SO2	CO	TSP	PM10
Diesel:							
Dump Truck	0.38	0.36	5.15	0.56	2.22	0.32	0.30
D-8 Dozer	2.92	2.80	24.62	2.70	6.78	2.19	2.08
Gasoline:							
Pickup Truck	1.08	0.98	0.77	0.04	31.68	0.05	0.05
Fugitive Dust						800	512
Commute	0.098	0.092	0.201	0.021	1.400	0.039	0.039
Total	4.47	4.24	30.73	3.32	42.09	802.59	514.47

Table A-18 OPERATIONAL EMISSIONS

Operations

Maximum Emissions/Day

	Emission Factors (grams/mile)							
	Miles (round trip)	ROC	NOx	SO2	CO	PM10 E	PM10 T	
Patrol	150	0.19	0.64	0.06	3.2	0.01	0.1	Based on a less than 6,000 lb vehicle vehicle traveling 50mph
Climbing Inspection	30	0.26	0.57	0.33	3.97	0.385	0.19	Based on a 6,000 lb and up vehicle traveling 40 mph
Pole Testing	50	1	5.27	0.33	10.63	0.385	0.19	Based on a 6,000 lb and up vehicle traveling 40 mph
Anchor Testing	50	1	5.27	0.33	10.63	0.385	0.19	Based on a 6,000 lb and up vehicle traveling 40 mph
ROW Maintenance	70	1.66	5.26	0.33	16.18	0.385	0.19	Based on a 6,000 lb and up vehicle traveling 25 mph
Repair of lines	30	1	5.27	0.33	10.63	0.385	0.19	Based on a 6,000 lb and up vehicle traveling 40 mph

		Total Emissions (grams)					
	# of Vehicles						
Patrol	1	28.5	96	9	480	1.5	15
Climbing Inspection	2	15.6	34.2	19.8	238.2	23.1	11.4
Pole Testing	3	150	790.5	49.5	1594.5	57.75	28.5
Anchor Testing	3	150	790.5	49.5	1594.5	57.75	28.5
ROW Maintenance	3	348.6	1104.6	69.3	3397.8	80.85	39.9
Repair of lines	3	90	474.3	29.7	956.7	34.65	17.1
Total (grams/day)		782.70	3290.10	226.80	8261.70	255.60	140.40
Total (lbs/day)		1.73	7.25	0.50	18.21	0.56	0.31

* Emissions estimations are based on the emission factors found in the SCAQMD CEQA handbook

APPENDIX E

BIOLOGICAL RESOURCES

VOLUME II

APPENDIX E
BIOLOGICAL RESOURCES

E.1 Biological Assessment for Special Status Species
E.2 Preliminary Report on Bird Electrocution/Collision Potential
E.3 Community and Habitat Restoration Plan-Objectives and General Guidelines
E.4 No Structure Zones for Biological Resources

APPENDIX E.1

Biological Assessment for Special Status Species

APPENDIX E.1 BIOLOGICAL ASSESSMENT FOR SPECIAL STATUS SPECIES

INTRODUCTION

This Biological Assessment was prepared for the proposed Alturas 345 kV Transmission Line Project which would run from Alturas, California, to Reno, Nevada. For a complete description of the Proposed Project, locations of the proposed substations, the proposed and alternative routes, and the configuration of the proposed structures please refer to Part B, Project Description, etc.

Construction and operation of the proposed transmission line would impact biological resources in the Modoc Plateau and Great Basin region in the vicinity of the transmission line route. Therefore, in accordance with Section 7(c) of the Federal Endangered Species Act of 1973, the United States Fish and Wildlife Service (USFWS) is responsible for providing consultation concerning the possible effects of the proposed transmission line project on special status species. Also in accordance with the National Environmental Policy Act (NEPA), Federal agencies should work with state agencies to the greatest extent possible in order to provide efficient and thorough guidance. Therefore, the California Department of Fish and Game (CDFG), which has special expertise and responsibilities under the California Endangered Species Act (CESA) (CHAPTER 1240, Stat. 1984), is also considered a cooperating agency. In accordance with NEPA, and CESA, all State- and Federally-listed species are discussed in the Biological Assessment. The term special status species refers to plants or animals that have been listed, proposed for listing, or are candidates for listing with the USFWS or CDFG as threatened or endangered. Special status species which have been identified as having the potential to occur in the vicinity of the proposed project are listed in Tables E-1 and E-2.

Special status species to be addressed in this document were identified through written correspondence with the agency personnel identified below:

Contact	Agency	Location
Janet Bair	USFWS	Reno, Nevada
Dave Harlow	USFWS	Reno, Nevada
Pete Lickwar	USFWS	Reno Nevada
Gary Schoolcraft	USBLM	Susanville, California
Bill Van Bruggan	U.S. Forest Service	Alturas, California
Pat Shanley	Toiyabe National Forest	Carson City, Nevada
Bruce Deuel	CDFG	Redding, California
Doug Thayer	CDFG	Alturas, California
Frank Hall	CDFG	Wendel (Honey Lake)
Syd Kahre	CDFG	Region I

Table E-1 Special Status Plant Species Known to Occur, or with Potential to Occur Along the Proposed Alturas Transmission Line Right-of Way, California and Nevada

Scientific Name Common Name[a]	USFWS Listing[b]	State Status[c]	CNPS Status[d]	Habitat Type	Distribution By County & State[e]	Flowering Phenology
Alisma gramineum[f] water plantain	—	—	—	pond, still waters	LAS, MOD, OR, WA ++	June-July
Allium atrorubens var. *atrorubens* Great Basin onion	—	—	2-1-2 List 2	Great Basin scrub, pinyon-juniper woodland	LAS, MNO, AZ, NV OR+	May-June
Antennaria flagellaris stoloniferous pussy-toes	—	—	1-2-1 List 2	Great Basin scrub	LAS, MOD, NV+	June-July
Arabis cobrensis Masonic rock cress	—	—	3-1-1 List 2	Great Basin scrub, pinyon-juniper woodland	MOD, MNO, NV	June-July
Arnica fulgens hillside arnica	—	—	3-1-1 List 2	Great Basin scrub, lower montane forest, moist meadow	LAS, MOD, PLU, NV OR, WA, ++	May-Aug
Arnica sororia twin arnica	—	—	1-2-1 List 4	Great Basin scrub, pinyon-juniper woodland, yellow pine forest	LAS, MNO, MOD, NV, OR, VA, ++	May-Aug
Astragalus agrestis[f] purple loco	—	—	3-2-1 List 2	vernally moist sagebrush	LAS, NV, OR, ++	April-July
Astragalus anxius troubled milk-vetch	C2	—	3-1-3 List 1B	volcanic scabland	LAS	May-June
Astragalus argophyllus var. *argophyllus* silverleaf milk-vetch	—	—	3-2-1 List 2	alkaline meadows	INY, LAS, MNO, AZ, ID, NV, UT+	May-July
Astragalus geyeri var. *geyeri* Geyer's milk-vetch	—	—	3-2-1 List 2	Great Basin scrub, stabilized sand	INY, LAS, MNO, NV, OR, WA+	May-July
Astragalus inversus Susanville milk vetch	—	—	1-1-3 List 4	Great Basin scrub, yellow pine forest	LAS, MOD, SHA, SIS	May-Aug
Astragalus lentiginousus var. *chartaceus* hard-podded freckled milk-vetch	C3c	—	2-2-1 List 2	Great basin scrub, northern juniper woodland	LAS, MOD, ID, OR NV, UT, WY	April-June
Astragalus pulsiferae var. *pulsiferae* Pulsifier's milk vetch	—	—	2-1-2 List 1B	Great Basin scrub (sandy)	LAS, PLU, SIE, NV	May-Aug
Astragalus pulsiferae var. *suksdorfii* Suksdorf's milk-vetch	C2	—	1-2-2 List 4	Montane conifer forest, northern juniper woodland	LAS, MOD, PLU, SHA NV, WA	April-Aug

Scientific Name Common Name[a]	USFWS Listing[b]	State Status[c]	CNPS Status[d]	Habitat Type	Distribution By County & State[e]	Flowering Phenology
Atriplex gardneri[f] var. *falcata* falcate saltbush	—	—	3-2-1 List 2	low chenopod scrub (subalkaline soils)	LAS, MOD, NV, OR+	June-Aug
Calochortus longebarbatus var. *longebarbatus* long-haired star tulip	C2	—	1-2-2 List 1B	meadow, seeps	MOD, SHA, SIS	June-Aug
Camissonia boothii ssp. *alyssoides* Pine Creek evening-primrose	—	—	1-1-1 List 4	Great Basin scrub	LAS,NV	May-Aug
Camissonia minor Nelson's evening-primrose	—	—	1-1-1 List 4	Great Basin scrub	MOD, NV	April July
Camissonia tanacetifolia ssp. *quadriperforata* Sierra Valley evening-primrose	C3c	—	1-1-3 List 4	Great Basin scrub (clay, sandy)	LAS, PLU, SIE	May-July
Carex petasata Liddon's sedge	—	—	2-1-1 List 2	lower coniferous forest, dry meadows	ALP, LAS, MNO, MOD OR, ++	June-July
Carex sheldonii Sheldon's sedge	—	—	2-1-1 List 2	wet meadows, marshes, streams	MOD, PLA, PLU, ID OR, UT+	Aug
Chenopodium simplex large-seeded goosefoot	—	—	1-1-1 List 4	open disturbed places, Great Basin scrub	INY, MOD, PLU, ++	June-Oct
Claytonia umbellata Great Basin claytonia	—	—	3-1-2 List 1B	talus	ALP, LAS, MNO, MOD, SIS, NV, OR	June-Aug
Cleomella hillmanii[f] Hillman's cleomella	—	—	—	Great Basin scrub (clay)	LAS, NV	April-June
Collomia tracyi Tracy's collomia	—	—	1-1-3 List 4	rocky, sandy areas, lower coniferous forest	HUM, LAS, SIS, TRI	June-July
Cordylanthus capitatus Yakima bird's-beak	—	—	1-2-1 List 2	open coniferous forest, northern juniper woodland	LAS, MOD, ID, NV OR, WA	July-Sept
Corydalis caseana ssp. *caseana* Sierra corydalis	C3c	—	1-1-3 List 4	meadows, springs, seeps, upper coniferous forest	BUT, LAS, PLA, PLU, SHA, SIE, TEH, TUL	June-Aug
Cryptantha scoparia desert crypthantha	—	—	1-1-1 List 4	chenopod scrub, Great Basin scrub	INY, LAS, NV, OR+	May-June
Dalea ornata ornate dalea	—	—	3-3-1 List 2	rocky or sandy places, Great Basin scrub	LAS, ID, NV, OR WA	May-June
Delphinium stachydeum spiked larkspur	—	—	1-1-1 List 4	coniferous forest (Warner Mtns)	LAS, MOD, ID, OR+	July-Aug
Dimeresia howellii doublet	—	—	1-1-1 List 4	pinyon-juniper woodland (volcanic)	LAS, MOD, SIS, NV	June-July

Scientific Name Common Name[a]	USFWS Listing[b]	State Status[c]	CNPS Status[d]	Habitat Type	Distribution By County & State[e]	Flowering Phenology
Downingia laeta[f] Great Basin downingia	—	—	—	vernal swales, pools	LAS, MOD, NV, OR	June-July
Drosera anglica English sundew	—	—	2-1-1 List 2	meadows, bogs, fens	LAS, NEV, PLU, SIE, SIS, ID, OR, WA	July-Aug
Erigeron elegantulus volcanic daisy	—	—	1-1-1 List 4	rocky places (volcanic), Great Basin scrub	LAS, MOD, SIS, OR	June-July
Eriogonum collinum[f] clay-loving buckwheat	—	—	1-2-1 List 4	Great Basin scrub, northern juniper woodland (fluffy clay)	LAS, NV	July-Sept
Eriogonum nutans var. *nutans* nodding buckwheat	—	—	3-1-1 List 2	Great Basin scrub	LAS, MNO, NV, OR, UT	July-Aug
Eriogonum robustum altered andesite buckwheat	C2	—	—	gravelly slopes, altered andesite	NV	May-July
Eriogonum prociduum prostrate buckwheat	C2	—	2-2-2 List 1B	Great Basin scrub, pinyon-juniper woodland	LAS, MOD, NV	May-July
Eriogonum umbellatum var. *glaberrimum* green buckwheat	—	—	3-1-1 List 2	Great Basin scrub, montane forest (gravel)	MOD, OR	June-Sept
Galium glabrescens ssp. *modocense* Modoc bedstraw	C3c	—	2-2-3 List 1B	Great Basin scrub	MOD	July
Galium serpenticum ssp. *warnerense* Warner Mountains bedstraw	C3c	—	3-2-2 List 1B	meadows, seeps in rocks	MOD, OR	July
Gentiana affinis var. *parvidentata* small-toothed prairie gentian	—	—	?-?-1 List 3	Great Basin scrub	MOD, ID, OR+	July-Sept
Geum aleppicum Aleppo avens	—	—	3-2-1 List 2	Great Basin Scrub (Meadows)	LAS, MOD, SIS, OR ++	June-Aug
Gratiola heterosepala Boggs Lake hedge-hyssop	C3c	E	1-2-2 List 1B	vernal pools	FRE, LAK, LAS, MAD, MOD, PLA, SAC, SHA, SJQ, SOL, STA, TEH, OR	April-June
Hackelia cusickii Cusick's stickseed	—	—	1-1-1 List 4	open juniper woodland	SIS, LAS, MOD, NV	May-July
Iliamna bakeri Baker's globe mallow	—	—	1-1-1 List 4	chaparral (volcanic), juniper woodland	LAS, MOD, SHA, SIS	July-Aug

Scientific Name Common Name[a]	USFWS Listing[b]	State Status[c]	CNPS Status[d]	Habitat Type	Distribution By County & State[e]	Flowering Phenology
Ivesia aperta var. *aperta* Sierra Valley ivesia	—	—	2-2-3 List 1B	dry, rocky meadows, Great Basin scrub	PLU, SIE	June-July
Ivesia aperta var. *canina* Dog Valley ivesia	C1	—	3-2-3 List 1B	dry meadows, forest clearings	SIE	June-Aug
Ivesia baileyi var. *baileyi* Bailey's ivesia	—	—	3-2-1 List 2	rock outcrops	LAS, PLU, NV	June-July
Ivesia baileyi var. *beneolens* Owyhee ivesia	—	—	—	volcanic cliffs, juniper woodland	MOD, ID, NV, OR	June-July
Ivesia paniculata Ash Creek ivesia	C2	—	2-1-3 List 1B	Great Basin scrub (volcanic)	LAS	June-July
Ivesia sericoleuca Plumas ivesia	—	—	1-2-3 List 1B	Great Basin scrub vernally mesic areas	NEV, PLA, PLU, SIE	June-Aug
Ivesia webberi Webber's ivesia	C2	—	3-2-2 List 1B	Great Basin scrub	PLU, SIE, NV	May-July
Juncus hemiendytus var. *abjectus* Center Basin rush	—	—	1-1-1 List 4	subalpine coniferous forest	ALP, LAS, MNO, NEV, PLU, SIE, TUL, TUO, ID, NV, OR	June-July
Lomatium foeniculaceum[f] var. *macdougalii* MacDougal's lomatium	—	—	2-2-1 List 2	Great Basin scrub, yellow pine forest, northern juniper woodland	LAS, MOD, PLU, OR	April-June
Lomatium hendersonii Henderson's lomatium	—	—	2-1-1 List 2	Great Basin scrub, northern juniper woodland	LAS, MOD, PLU, OR	April-June
Lomatium ravenii Raven's lomatium	C3c	—	1-1-1 List 4	Great Basin scrub (often alkaline soils)	LAS, NV, OR, UT	April-May
Lupinus uncialis[f] Lilliput lupine	—	—	2-2-1 List 2	Great Basin scrub	MOD, NV, OR	May-July
Mimulus pygmaeus Egg Lake monkeyflower	C2	—	1-2-2 List 4	lower coniferous forest, meadows	LAS, MOD, PLU, OR	May-July
Opuntia pulchella sand cholla	C3c	CY	2-2-2 List 2	dry lake borders, sandy flats	INY, MNO, AZ, NV	May-June
Oryctes nevadensis Nevada oryctes	C2	—	3-3-2 List 2	chenopod scrub	INYO, NV	July
Pedicularis centranhera dwarf lousewort	—	—	3-1-1 List 2	Great Basin scrub	LAS, OR, NV, UT+	April-May

Scientific Name Common Name[a]	USFWS Listing[b]	State Status[c]	CNPS Status[d]	Habitat Type	Distribution By County & State[e]	Flowering Phenology
Penstemon cinereus gray beardtongue	—	—	1-1-1 List 4	volcanic gravels, Great Basin scrub	MOD, SIS, NV	May-July
Penstemon cinicola ash beardtongue	—	—	1-2-1 List 4	volcanic sands, lower coniferous forest	LAS, MOD, SIS	May-July
Penstemon neotericus Plumas County beardtongue	—	—	1-1-3 List 4	lower coniferous forest	LAS, PLU, SHA, SIE	May-Aug
Penstemon heterodoxus var. *shastensis* Shasta penstemon	—	—	1-1-3 List 4	dry meadows, yellow pine forest	MOD, SHA, SIS	June-Aug
Phacelia inundata playa phacelia	—	—	1-1-1 List 2	alkaline soils, Great Basin scrub	LAS, MOD, NV	May-July
Polyctenium williamsiae William's combleaf	C1	CE (NV)	—	vernally moist swales	NV	
Polygala subspinosa spiny milkwort	—	—	2-2-1 List 2	gravelly soils, Great Basin scrub	LAS, NV+	June-July
Polygonum polygaloides ssp. *esotericum* Modoc County knotweed	—	—	3-3-3 List 1B	vernal pools, juniper woodland	MOD, PLU	May-Aug
Polygonum polygaloides[f] ssp. *polygaloides* white-margined knotweed	—	—	—	vernal pools, swales	LAS, MOD, WA, OR	May-Aug
Potamogeton epihydrus ssp. *nuttallii* Nuttall's pondweed	—	—	2-2-1 List 2	shallow freshwater	ELD, MEN, MOD, MPA PLU, OR, WA, ++	July-Aug
Potamogeton filiformis slender-leaved pondweed	—	—	3-2-1 List 2	shallow freshwater	LAS, MER, MNO, SCL** AZ, NV, OR, ++	May-July
Potamogeton zosteriformis eel-grass pondweed	—	—	2-2-1 List 2	freshwater	CCA, LAK, LAS, MOD PLU, SHA, OR, WA, ++	June-July
Potentilla basaltica Soldier Meadows cinquefoil	C1	—	3-1-2 List 1B	alkaline meadows, (volcanic)	LAS, NV	May-July
Psilocarphus elatior tall wooly marbles	—	—	1-1-1 List 4	vernally moist areas	LAS, MOD, OR, ++	May-Aug
Psoralidium lanceolatum[f] lance-leaved scurf-pea	—	—	3-2-1 List 2	Great Basin scrub (sandy)	LAS, NV, ++	April-Aug
Ribes hudsonianum var. *petiolare* western black currant	—	—	3-1-1 List 2	streamsides	MOD, SIS	May-July
Rorippa columbiae Columbia yellow cress	C2	—	3-2-2 List 1B	juniper woodland (meadows, playas)	HUM, MOD, SIS	June-July

Scientific Name Common Name[a]	USFWS Listing[b]	State Status[c]	CNPS Status[d]	Habitat Type	Distribution By County & State[e]	Flowering Phenology
Scutellaria holmgreniorum Holmgren's skullcap	C3c	—	2-1-2 List 1B	volcanic clays (rocky), Great Basin scrub	LAS, NV	June-July
Senecio hydrophiloides sweet marsh butterweed	—	—	?-?-1 List 3	lower coniferous forest	BUT, MOD, PLU, SIS, NV	May-July
Spartina gracilis alkali cord grass	—	—	1-1-1 List 4	alkaline meadows Great Basin scrub	INY, LAS, MOD, MNO, SIS, NV	June-Aug
Sphaeralcea grossulariifolia[f] current-leaved desert mellow	—	—	—	Great Basin scrub	LAS, NV, OR, WA UT	May-June
Stanleya viridiflora[f] green prince's plume	—	—	3-2-1 List 2	white ash deposits	LAS, NV, UT	June-Aug
Stenotus lanuginosus woolly stenotus	—	—	3-2-1 List 2	montane sagebrush scrub	LAS, OR, WA	May-July
Trifolium lemmonii Lemmon's clover	C3c	—	1-1-2 List 4	Great Basin scrub, yellow pine forest	NEV, PLU, SIE, NV	June-July
Tripterocalyx crux-maltae[f] Kellogg's sand verbena	—	—	3-2-2 List 1B	stabilized sand dunes, Great Basin scrub	LAS, NV	May-July
Psilocarphus elatior tall wooly-marbles	--	--	1-1-1 List 4	vernally moist areas, meadows, valley and foothill grassland	LAS, MOD, OR	May-Aug
Thelypodium milleflorum thousand-flowered thelypodium	--	--	--	sandy sites in Great Basin scrub	LAS, PLU, NV, OR, ID, WA	Apr-Jun
Pogogyne floribunda profuse-flowered pogogyne	--	--	2-2-3 List 1B	vernal pools, Devil's Garden	LAS, MOD, SHA	Jun-Aug
Carex atherodes awned sedge	--	--	--	wet meadows and shallow water	MOD, NY to MO, OR, WA, CO, UT	Jun-Aug

Notes:

[a] Botanical nomenclature corresponds to Hickman (1993a).

[b] U.S. Fish and Wildlife Service (1990).
Cat. 1 = Under review, sufficient information to justify listing.
Cat. 2 = Under review, insufficient information.
Cat 3c = Not presently threatened.

[c] Section 1904, California Fish and Game Code (September listing; CDFG 1992): E = Endangered.
NRS 527.060-527.120, Nevada Division of Forestry: CY = Protected cactus; CE(NV) = Critically Endangered

[d] CNPS *Inventory of Rare and Endangered Vascular Plants of California*, Fifth Edition (Skinner and Pavlik 1994).
List 1B = Plants rare, threatened, or endangered in California and elsewhere.
List 2 = Plants rare, threatened, or endangered in California, but more common elsewhere.
List 3 = Plants about which we need more information -- a review list.
List 4 = Plants of limited distribution -- a watch list.

The R-E-D numbers are encoded as follows:

Rarity: 1 - rare, but found in sufficient numbers and distributed widely enough that the potential for extinction or extirpation is low at this time; 2 - occurrence confined to several populations or to one extended population; 3 - occurrence limited to one or a few highly restricted populations, or present in such small numbers that it is seldom reported.
Endangerment: 1 - not endangered; 2 - endangered in a portion of its range; 3 - endangered throughout its range.
Distribution: 1 - widespread outside California; 2 - rare outside California; 3 - endemic to California.

5. Habitat type from Munz and Keck (1973), Kinner and Pavlik (1988), Hickman (1993), Clifton (Per. Comm.)

° Skinner and Pavlik (1994), Morefiled and Knight (1992); some county records from unpublished information or from data presented in this report.

County Key:

ALP - Alpine
AMA - Amador
BUT - Butte
DNT - Del Norte
FRE - Fresno
HUM - Humboldt
INY - Inyo
LAK - Lake
LAS - Lassen
MAD - Madera
MOD - Modoc
MNO - Mono
NAP - Napa
PLA - Placer
PLU - Plumas
SAC - Sacramento
SHA - Shasta
SIE - Sierra
SIS - Siskiyou
SJQ - San Joaquin
SOL - Solano
SON - Sonoma
STA - Stanislaus
TEH - Tehama
TRI - Trinity
TUL - Tulare
TUO - Tuolumne
YUB - Yuba

State Key:

AZ - Arizona
ID - Idaho
NV - Nevada
OR - Oregon
UT - Utah
WA - Washington
WY - Wyoming

f Plants presently not listed by USFWS, Nevada, California or CNPS, but meeting at least one of the following criteria:

1. Plants previously not known from California which may be listed by CNPS, or meet criteria for listing under CEQA;
2. Plants of limited distribution in California which may be listed by CNPS, or meet criteria for listing under CEQA.

Table E-2 Special Status Wildlife Species which may Occur within the Right-of-Way of the Alturas 345 kV Transmission Line

Common Name	Species Name	Federal and State Legal Status*
BIRDS		
American White Pelican	*Pelicanus erythrorhynchos*	CSC
Double-Crested Cormorant	*Phalacrocorax auritus*	CSC
Western Least Bittern	*Ixobrychus exilis hesperis*	C2/CSC
White-Faced Ibis	*Plegadis chihi*	C2/CSC
Swainson's Hawk	*Buteo swainsoni*	ST
Ferruginous Hawk	*Buteo regalis*	C2/CSC
Golden Eagle	*Aquila chrysaetos*	CSC
Bald Eagle	*Haliaeetus leucocephalus*	FE/SE
Northern Harrier	*Circus cyaneus*	CSC
Prairie Falcon	*Falco mexicanus*	CSC
American Peregrine Falcon	*Falco peregrinus anatum*	FE/SE
Sage Grouse	*Centrocercus urophasianus*	C2/CSC
Mountain Quail	*Oreortyx pictus*	C2
Greater Sandhill Crane	*Grus canadensis tabida*	ST
Western Snowy Plover	*Charadrius alexandrinus nivosus*	C2/CSC
Long-Billed Curlew	*Numenius americanus*	C2/CSC
Black Tern	*Chlidonias niger*	C2/CSC
Western Yellow-Billed Cuckoo	*Coccyzus americanus occidentalis*	SE
Burrowing Owl	*Athene cunicularia*	CSC
Great Gray Owl	*Strix nebulosa*	SE
Long-Eared Owl	*Asio otus*	CSC
Short-Eared Owl	*Asio flammeus*	CSC
Willow Flycatcher	*Empidonax trailli*	SE
Bank Swallow	*Riparia riparia*	ST
Loggerhead Shrike	*Lanius ludovicianus*	C2/CSC
Yellow Warbler	*Dendroica petechia brewsteri*	CSC
Tricolored Blackbird	*Agelaius tricolor*	C2/CSC
FISH		
Short-Nosed Sucker	*Chasmistes brevirostris*	FE/SE
Lost River Sucker	*Deltistes luxatus*	FE/SE
Modoc Sucker	*Catostomus microps*	FE/SE
Pit Roach	*Lavinia symmetricus mitrulus*	C2/CSC
Hardhead	*Mylopharodon conocephalus*	CSC
AMPHIBIANS		
Spotted Frog	*Rana pretiosa*	C2/CSC
Great Basin Spadefoot Toad	*Scaphiopus intermontanus*	CSC
REPTILES		
Northwestern Pond Turtle	*Clemmys marmorata marmorata*	C2/CSC
MAMMALS		
Townsend's Western Big-Eared Bat	*Plecotus townsendii townsendii*	C2/CSC
Spotted Bat	*Euderma maculatum*	C2/CSC
California mastiff Bat	*Eumops perotis californicus*	C2/CSC
Pallid Bat	*Antrozous pallidus*	CSC
Pygmy Rabbit	*Brachylagus idahoensis*	C2/ST
Pronghorn	*Antilocapra americana*	C2
California Bighorn Sheep	*Ovis canadensis californiana*	C2/ST
American Badger	*Taxidea taxus*	CSC

Source: California Natural Diversity Database; Federal Register.

*SE = State Endangered
FE = Federally Listed as Endangered
ST = State Threatened
FT = Federally Listed as Threatened
CSC = California Species of Special Concern
C2 = Category 2; more information needed prior to proposing species listing.

In addition to receiving lists of sensitive species from the USFWS, a computer search of the CDFG Natural Diversity Database was conducted, and the Applicant's Preliminary Environmental Assessment document was referenced (BioSystems, 1994a).

A literature search, field surveys, and consultation with experts, including CDFG District Biologists, were conducted for the special status species with the potential to occur in the vicinity of the Proposed Project area. Field surveys were conducted during the appropriate flowering period or period of occurrence for the special status species. During field surveys presence of special status species or their habitats were documented within 0.5 mile of the proposed center line for several wildlife species including Swainson's hawk and greater sandhill crane. Botanical resources were identified and documented within a 660-foot-wide corridor centered on the proposed transmission line route and route segment alternatives.

For each of the species addressed below the following information is provided:

- Regulatory status
- Ecology
- Distribution in the project area
- Project impacts.

SPECIAL STATUS PLANTS

More than 160 special status plant populations representing 20 plant species were documented within the project study area (Table E-3). More than two-thirds of those populations are located on the proposed project route while the remaining are located on alternative alignments. None of the special status species observed in the project study area are proposed or listed as rare or endangered by California or Nevada. Three potentially affected species are Federal Category 2 candidates and two species are Federal Category 3c candidates. Two of the 20 plant species are on the California Native Plant Society's (CNPS) List 1B, four are CNPS List 2 species, one is a CNPS List 3 species, and six are CNPS List 4 species. Six of the 20 plant species documented in the project study area have no Federal, State, or CNPS status but qualify for consideration under CEQA because of their limited distributions in California.

Field surveys were conducted in April, May, June, and July 1994 for the special status plant species listed in Table E-1. This section addresses the 20 plant species that were observed in the project study area (Table E-3). The remaining species that were not observed in the project study area are summarized in Table E-1.

The legal status, background, ecology, documented distribution in the project vicinity and the study area, and potential for impacts are described below for each of the 20 species documented in the project study corridor. Potential cumulative impacts to these species related to the Tuscarora Pipeline Project are also

Table E-3 Special Status Plant Populations Observed in the Project Study Corridor

Record[a]	Alignment	AnglePt.	Begin (ft)	End (ft)	linear distance (ft)	Species	Est. Population	Avoid[b]	No. of Prop. Structures[c]	Overland Travel (ft)[d]
30	A	A4	0	0	0	*Dimeresia howellii*	50	?		
2	A	A4	0	0	0	*Eriogonum prociduum*	25	?		
7	A	A4	0	0	0	*Eriogonum prociduum*	10	?		
7	A	A4	0	0	0	*Eriogonum prociduum*	10	?		
5	A	A4	0	0	0	*Lupinus uncialis*	●	?		
30	A	A4	0	0	0	*Lupinus uncialis*	●	?		
7	A	A6	0	0	0	*Dimeresia howellii*	50	X		
7	A	A5	0	0	0	*Lupinus uncialis*	30	?		
1	B&A	B7	12350	12600	250	*Dimeresia howellii*	75		1	
7	C	A6	14000	15050	1650	*Astragalus pulsiferae var. suksdorfii*	500	X		
12	C	A5	0	0	0	*Dimeresia howellii*	30	X		
14	C	A6	0	0	0	*Dimeresia howellii*	30	X		
14	C	A6	0	0	0	*Dimeresia howellii*	50	?		
16	C	A6	0	0	0	*Dimeresia howellii*	75	X		
16	C	A6	0	0	0	*Eriogonum prociduum*	250	?		
16	C	A6	14625	14800	175	*Eriogonum prociduum*	250			?
12	C	C1	100	150	50	*Astragalus pulsiferae var. suksdorfii*	25			
80	C	C1	350	1500	1650	*Astragalus pulsiferae var. suksdorfii*	500		●	
81	C	C1	2300	3000	700	*Astragalus pulsiferae var. suksdorfii*	500	*		
16	C	C1	3150	3225	75	*Astragalus pulsiferae var. suksdorfii*	50	X		
16	C	C1	4440	5250	810	*Astragalus pulsiferae var. suksdorfii*	250		●	
16	C	C1	910	1010	100	*Dimeresia howellii*	250			
79	A	C10	0	0	0	*Arnica sororia*	25	?		
80	A	C10	0	0	0	*Arnica sororia*	10	?		
78	A	C10	2255	3100	845	*Arnica sororia*	1000			
81	A	C10	0	0	0	*Hackelia cusickii*	200	*		
79	C	C2	0	0	0	*Astragalus pulsiferae var. suksdorfii*	●	?		
81	C	C2	4000	9240	5240	*Lomatium hendersonii*				
B2	C	C2	9400	10400	1000	*Lomatium hendersonii*				
B3	C	C2	10860	11700	810	*Lomatium hendersonii*				
22	C	C3	14000	21250	1650	*Astragalus pulsiferae var. suksdorfii*	500		●	200
23	C	C3	22200	23050	850	*Astragalus pulsiferae var. suksdorfii*	500		●	400
B3	C	C3	0	200	200	*Lomatium hendersonii*				

Table E-3 Special Status Plant Populations Observed in the Project Study Corridor

Record[a]	Alignment	AnglePt.	Begin (ft)	End (ft)	linear distance (ft)	Species	Est. Population	Avoid[b]	No. of Prop. Structures[c]	Overland Travel (ft)[d]
B8	C	C3	8960	9740	780	*Lomatium hendersonii*		X		
B6	C	C3	16200	16860	660	*Lomatium hendersonii*		X		
B6	C	C3	18240	19400	1160	*Lomatium hendersonii*				
B8	C	C3	20400	22300	1900	*Lomatium hendersonii*				
B8	C	C3	23300	24840	1540	*Lomatium hendersonii*				
27	C	C7	0	0	0	*Arnica sororia*	50			
24	C	C3	0	0	2	*Hackelia cusickii*	150	?		
28	C	C7	0	0	0	*Hackelia cusickii*	200	?		
B8	C	C9	0	400	400	*Lomatium hendersonii*				
B8	C	C9	1500	2600	1100	*Lomatium hendersonii*				
B10	C	C3	3600	7000	3400	*Lomatium hendersonii*				
B10	C	C9	9200	10400	1200	*Lomatium hendersonii*				
28	C	C5	1530	3500	1970	*Hackelia cusickii*	1000		2	2000
29	C	C5	8050	9945	1895	*Hackelia cusickii*	1000		2	2500
B12	C	C5	900	900	0	*Lomatium hendersonii*		X		
30	C	C7	0	0	0	*Arnica sororia*	500	?		
30	C	C7	0	0	0	*Arnica sororia*	100	?		
32	C	C7	3325	3465	140	*Arnica sororia*	250	X		
30	C	C7	4180	4490	310	*Arnica sororia*	500	X		
34	C	C7	7185	7465	280	*Arnica sororia*	500			
30	C	C3	7940	8090	450	*Arnica sororia*	500			
36	C	C7	4550	5375	825	*Hackelia cusickii*	1000	*(OT)		
36	C	C7	1345	2045	700	*Arnica sororia*	1000			
39	C	C9	2410	2770	360	*Arnica sororia*	500	X		
30	C	C7	2965	3005	40	*Arnica sororia*	300	X		
30	C	C9	5500	5850	350	*Arnica sororia*	250			
37	C	C9	0	0	0	*Hackelia cusickii*	100	X		
43	C	C9	0	0	2	*Hackelia cusickii*	150	X		
42	C	C9	3540	3615	75	*Hackelia cusickii*	100	X		
39	D	D2	5195	5645	450	*Arnica sororia*	500	X		
46	D	D2	0	0	0	*Hackelia cusickii*	75	X		
47	D	D2	0	0	0	*Hackelia cusickii*	10	X		
48	D	D2	0	0	0	*Hackelia cusickii*	75	X		

Table E-3 Special Status Plant Populations Observed in the Project Study Corridor

Record[a]	Alignment	AnglePt.	Begin (ft)	End (ft)	linear distance (ft)	Species	Est. Population	Avoid[b]	No. of Prop. Structures[c]	Overland Travel (ft)[d]
44	D	D2	2690	3177	487	*Hackelia cusickii*	1000	X		
75	D	D2	3690	3990	300	*Hackelia cusickii*	1000			500
54	D	D3	0	0	0	*Arnica sororia*	500	?		
61	D	D3	0	0	0	*Arnica sororia*	100	X		
61	D	D3	2700	3115	415	*Arnica sororia*	1000	X		
55	D	D3	3060	6250	1370	*Arnica sororia*	2000		1	
61	D	D3	7095	7450	355	*Arnica sororia*	500	X		
60	D	D3	7865	8240	375	*Arnica sororia*	500	X		
62	D	D3	0	0	0	*Erigeron elegantulus*	1	X		
83	D	D3	0	0	0	*Erigeron elegantulus*	●			
61	D	D3	0	0	0	*Erigeron elegantulus*	2			
61	D	D3	0	0	0	*Hackelia cusickii*	200	?		
62	D	D3	0	0	0	*Hackelia cusickii*	100	?		
62	D	D3	0	0	0	*Hackelia cusickii*	500	X		
75	D	D3	0	0	0	*Hackelia cusickii*	200	?	1	100
60	D	D3	0	0	0	*Hackelia cusickii*	1500			
53	D	D3	3930	4000	70	*Hackelia cusickii*	500	X		
60	D	D3	6755	7450	695	*Hackelia cusickii*	2000	*(OT)		
57	D	D3	8060	9068	1008	*Hackelia cusickii*	2000	*(OT)		
60	D	D3	9580	9950	375	*Hackelia cusickii*	2000	*(OT)		
61	D	D3	12370	12450	80	*Hackelia cusickii*	500	?		200
64	D	D3	12660	13350	695	*Hackelia cusickii*	2000			700
61	D	D3	0	0	0	*Hackelia cusickii*	500			
60	D	D3	0	0	0	*Hackelia cusickii*	75	?	1	700
62	D	D3	175	929	754	*Hackelia cusickii*	500			
73	D	D5	2785	2795	80	*Erigeron elegantulus*	●	X		
73	D	D7	0	0	0	*Arnica sororia*	100	X		
71	D	D3	7270	6250	980	*Arnica sororia*	500	?		
72	D	D7	0	0	0	*Erigeron elegantulus*	75	?		
75	D	D7	0	0	0	*Erigeron elegantulus*	3	?		
71	D	D7	100	775	375	*Erigeron elegantulus*	250			
75	D	D3	7830	8090	260	*Erigeron elegantulus*	200		1	
77	D	D7	9255	9640	385	*Erigeron elegantulus*	500		1	

Table E-3 Special Status Plant Populations Observed in the Project Study Corridor

Record[a]	Alignment	AnglePt.	Begin (ft)	End (ft)	linear distance (ft)	Species	Est. Population	Avoid[b]	No. of Prop. Structures[c]	Overland Travel (ft)[d]
85	E	D8	1720	2350	630	*Arnica sororia*	500		0	
B13	E	E1	12150	12600	450	*Arnica sororia*				
B14	E	E1	14000	14200	200	*Arnica sororia*		X		
B15	E	E2	400	8250	650	*Arnica sororia*				
B16	E	E2	2950	3650	400	*Hackelia cusickii*				
B17	E	E2	3750	6450	400	*Hackelia cusickii*				
B18	E	E2	18000	18000	0	*Lomatium ravenii*		X		
B15	E	E7	19000	19000	0	*Lomatium ravenii*		X		
B26	E	E4	400	1950	1550	*Psilocarphus elatior*				
B21	E	E1	6200	5800	0	*Erigeron elegantulus*		X		
B22	E	E6	6200	6100	0	*Erigeron elegantulus*		X		
B23	E	E6	10100	10500	400	*Erigeron elegantulus*		X		
B25	E	E7	3750	8250	0	*Astragalus agrestis*		X		
B23	E	E7	0	1300	1300	*Erigeron elegantulus*		X		
B26	E	E7	3300	7200	3900	*Lomatium ravenii*				
B26	E	E7	12700	18300	5600	*Lomatium ravenii*				
B26	K	E4	0	3450	3450	*Lomatium ravenii*				
89	E	F3	5740	8609	2869	*Arnica sororia*	10000		4	
87	F	F3	0	0	0	*Astragalus agrestis*	1	X		
89	F	F3	5690	8609	2919	*Astragalus agrestis*	2000		0	
88(F)	E	F3	11319	16539	5220	*Astragalus agrestis*	2000		0	
88(H)	H	F3	0	350	350	*Astragalus agrestis*	2000		0	350
88(J)	J	J1	0	600	600	*Astragalus agrestis*	2000		0	600
89	I	J2	2000	13200	11200	*Astragalus agrestis*	500		11	10500
B26	I	J1	400	2350	1550	*Lomatium ravenii*				
B26	I	J1	3550	5050	1500	*Lomatium ravenii*				
B26	J	J2	0	1600	1600	*Lomatium ravenii*				
B30	I	J2	1950	2250	400	*Lomatium ravenii*				
B31	I	J2	2800	3300	400	*Lomatium ravenii*				
B30	I	J2	3750	4100	350	*Lomatium ravenii*				
B33	J	J3	5100	6000	900	*Lomatium ravenii*				
94	J	J4	32377	32377	0	*Erigeron elegantulus*	10	X		
95	J	J7	9600	10800	1200	*Astragalus pulsiferae var. suksdorfii*	750			800

Table E-3 Special Status Plant Populations Observed in the Project Study Corridor

Record[a]	Alignment	AnglePt.	Begin (ft)	End (ft)	linear distance (ft)	Species	Est. Population	Avoid[b]	No. of Prop. Structures[c]	Overland Travel (ft)[d]
98	J	J7	12600	13000	100	*Astragalus pulsiferae var. suksdorfii*	100	X		
B35	J	J8	18100	18500	100	*Scutellaria holmgreniorum*				
102	L	J8	22700	22750	50	*Astragalus pulsiferae var. suksdorfii*	10	?		
107	L	J8	24940	24990	50	*Astragalus pulsiferae var. suksdorfii*	75	?		
102	L	J8	25530	25450	420	*Astragalus pulsiferae var. suksdorfii*	75	?		
97	L	J8	0	0	0	*Scutellaria holmgreniorum*	500	?		
98	L	J8	0	0	0	*Scutellaria holmgreniorum*	250	?		
103	L	J8	0	0	0	*Scutellaria holmgreniorum*	75	X		
103	L	J8	0	0	0	*Scutellaria holmgreniorum*	250	?		
105	L	J8	0	0	0	*Scutellaria holmgreniorum*	10	X		
98	L	J8	6400	6800	100	*Scutellaria holmgreniorum*	10			
101	L	J8	10200	10382	182	*Scutellaria holmgreniorum*	250	?		
102	L	J8	10200	13350	650	*Scutellaria holmgreniorum*	5000			1000
100	L	J8	18165	18240	75	*Scutellaria holmgreniorum*	10	?		
93	K	K1	0	0	0	*Camissonia boothii ssp. alyssoides*	2	?		
92	K	K1	0	0	0	*Erigeron elegantulus*	0	X		
98	K	K1	1374	1404	30	*Erigeron elegantulus*	200	X		
B26	K	K1	0	950	950	*Lomatium ravenii*				
B33	K	K2	3500	3500	0	*Eriogonum collinum*		X		
B35	K	K2	2950	7800	4850	*Lomatium ravenii*				
B35	K	K2	9000	9900	900	*Lomatium ravenii*		X		
B37	K	K6	17950	24100	6150	*Scutellaria holmgreniorum*				
B38	K	K6	25450	25450	0	*Scutellaria holmgreniorum*		X		
116	L	L1	0	0	0	*Astragalus pulsiferae var. suksdorfii*	75	X		
102	L	L1	2524	2624	100	*Astragalus pulsiferae var. suksdorfii*	500	X		
113	L	L1	3865	3930	65	*Astragalus pulsiferae var. suksdorfii*	75	X		
102	L	L1	109	110	0	*Camissonia boothii var. alyssoides*	10	?		
111	L	L1	850	1520	670	*Scutellaria holmgreniorum*	500	X(OT)		
116	L	L2	0	0	0	*Astragalus pulsiferae var. suksdorfii*	75	X		
117	L	L1	0	0	0	*Astragalus pulsiferae var. suksdorfii*	200	X		
116	L	L1	570	570	0	*Astragalus pulsiferae var. suksdorfii*	0	?		
116	L	L2	1540	1640	100	*Astragalus pulsiferae var. suksdorfii*	250	X		
118	L	L2	8356	8486	130	*Astragalus pulsiferae var. suksdorfii*	100	X		

Table E-3 Special Status Plant Populations Observed in the Project Study Corridor

Record[a]	Alignment	AnglePt.	Begin (ft)	End (ft)	linear distance (ft)	Species	Est. Population	Avoid[b]	No. of Prop. Structures[c]	Overland Travel (ft)[d]
119	L	L2	10420	10495	75	*Polygala subspinosa*	100			
128	L	L3	6695	6735	40	*Polygala subspinosa*	100	X		
120	L	L3	2185	2195	10	*Scutellaria holmgreniorum*	500	X		
128	L	L4	0	0	0	*Camissonia boothii ssp. alyssoides*	250	X		
125	L	L4	9077	10064	987	*Camissonia boothii ssp. alyssoides*	500		1	500
128	L	L4	6465	6525	50	*Polygala subspinosa*	100	X		
123	L	L4	7736	8535	799	*Polygala subspinosa*	250			
126	L	L4	9493	10094	601	*Polygala subspinosa*	500	X		
125	L	L5	4784	4784	0	*Atriplex gardneri var. falcata*	100	X		
139	L	L5	5434	5584	150	*Pedicularis centranthera*	100	X		
127	L	L5	0	2526	2526	*Polygala subspinosa*	100		3	2500
128	L	L5	1940	2530	590	*Polygala subspinosa*	100		3	2500
138B	L	L6	21910	22100	190	*Atriplex gardneri var. falcata*	10	X		
146	L	L6	0	0	0	*Camissonia boothii ssp. alyssoides*	10	X		
131	L	L6	1075	1350	275	*Camissonia boothii ssp. alyssoides*	100	X		
139	L	L6	7000	1950	50	*Camissonia boothii ssp. alyssoides*	100	X		
131	L	L6	2100	2160	60	*Camissonia boothii ssp. alyssoides*	100	X		
144	L	L6	16800	15800	0	*Camissonia boothii ssp. alyssoides*	?	X		
137	L	L6	19975	21250	1275	*Camissonia boothii ssp. alyssoides*	100		1	1200
138A	L	L6	21910	22100	190	*Camissonia boothii ssp. alyssoides*	100	X		
135	L	L6	0	0	0	*Stanleya viridiflora*	50	?		
132	L	L6	1490	1510	20	*Stanleya viridiflora*	10	X		
143	L	L6	15600	15800	200	*Stanleya viridiflora*	?	?		
139	L	L7	4384	4534	150	*Camissonia boothii ssp. alyssoides*	500	X		
140	L	L7	4484	4584	100	*Polygala subspinosa*	10	?		
141	L	L7	9292	9534	242	*Polygala subspinosa*	10	X		
132	L	L6	7000	11000	4000	*Polygala subspinosa*	2000		1	4000
146	N	L6	593	644	50	*Polygala subspinosa*	100	X		
146	M	L6	2563	2763	200	*Polygala subspinosa*	500			200
147	M	L6	3165	3205	40	*Polygala subspinosa*	500	X		
B40	M	L9	8500	9500	1000	*Thelypodium millefolium*		X		
148	O	M3	0	0	0	*Camissonia minor*	75	?		
149	O	O1	4656	5156	500	*Camissonia minor*	10	X		

Table E-3 Special Status Plant Populations Observed in the Project Study Corridor

Record[a]	Alignment	AnglePt.	Begin (ft)	End (ft)	linear distance (ft)	Species	Est. Population	Avoid[b]	No. of Prop. Structures[c]	Overland Travel (ft)[d]
153	Q	O5	17287	18494	1207	*Camissonia minor*	250		2	
151	Q	O5	0	0	1	*Psoralidium lanceolatum*	500	X		
152	Q	O5	8761	9392	631	*Psoralidium lanceolatum*	250			700
151	Q	O5	9724	9949	225	*Psoralidium lanceolatum*	250			200
155	Q	O5	10381	10760	379	*Psoralidium lanceolatum*	250		?	?
155	Q	O5	14235	14883	648	*Psoralidium lanceolatum*	750		1	700
155	Q	O5	15440	17082	1642	*Psoralidium lanceolatum*	1000		1	1500
151	Q	Q1	8110	8275	165	*Psoralidium lanceolatum*	250	X		
155	V	V2	14735	14960	225	*Astragalus pulsiferae var. pulsiferae*	500	X		
151	V	V2	15350	15520	170	*Astragalus pulsiferae var. pulsiferae*	100	X		
160	X	X9	0	0	0	*Eriogonum robustum*	75	X		
161	X	X9	0	0	0	*Eriogonum robustum*	2	X		
162	Y	X9	0	0	0	*Eriogonum robustum*	20	X		

[a] WCC data sheet record number; BioSystems early season survey records are preceded by a "B"

[b] Key to avoidance column: ?=populations where avoidance is probably possible but not proposed by Sierra Pacific; X=populations that have been proposed for avoidance by Sierra Pacific; *=populations that are designated for avoidance by Sierra Pacific Power Company but avoidance is unlikely due to the dimensions of the population relative to the corridor. A blank line indicates populations that are not likely to be avoided during construction.

[c] Number of structures that may be constructed within the confines of the plant population based on the linear extent of the population within the project corridor. A blank line indicates populations that are unlikely to have structures placed within their boundaries.

[d] Linear distance of overland travel that may occur within the confines of the plant population during construction. A blank line indicates no overland travel is anticipated.

discussed. Specific mitigation and monitoring plans for impacts to special status plant species will be contained in the Community and Habitat Restoration Plan for the Proposed Project as specified in Appendix E.3.

Twin Arnica (Arnica sororia)

Twin arnica is a CNPS List 2 species with no Federal or State status. In California, the species is found in Lassen, Mono, and Modoc counties. Outside of California, twin arnica is found from southern British Columbia and Alberta in Canada, to Oregon, northern Nevada, Utah, and Wyoming (Cronquist 1994).

Twin arnica is a rhizomatous perennial herb in the Sunflower Family. In the study area it is typically found in openings in sagebrush scrub, northern juniper woodland, and at the margins of montane meadows. The species was observed as far south as the Madeline Plains, where it was associated with vernally moist silver sagebrush scrub communities, and as far north as the lava plateaus west of Likely, California. Surveys for the Tuscarora Pipeline Project found the species growing in several large populations northwest of Canby, California. A total of 25 populations supporting more than 17,000 plants was identified during surveys for the Alturas Transmission Line Project. An additional 44 populations supporting more than 61,000 plants were documented during surveys for the Tuscarora Pipeline Project. Populations of twin arnica in the project study corridor were observed on Segments C, D, E, and F. The northern limit of the species on the project corridor was located between Angle Points CØ4 and CØ5, west of Likely, California. The southern limit was located on the Madeline Plains northwest of Termo, California.

BioSystems (1994b) has concluded that the species is much more abundant and widespread than previously known. Information collected by WCC during 1994 botanical surveys substantiates that conclusion. Two factors that have been considered in this conclusion are:

- The distribution of the habitat for the species
- The size of the area sampled

The habitat for this species is not uncommon in the project vicinity. Extrapolating from the two corridors sampled by BioSystems (1994b) and WCC, it is reasonable to conclude that the total size and distribution of the species does not satisfy the criteria for evaluation as a rare species under CEQA.

Populations of the species on Segments C and E will be avoided by placement of structures and designation of overland travel routes outside of the limits of the known populations. Therefore, no direct impacts to twin arnica are anticipated if the proposed project route is selected. However, several populations of twin arnica will be impacted if the Madeline Plains alternative were selected.

Surface disturbance impacts related to the placement of six transmission line structures will occur on alternative alignment Segments D3-D4, F4-F3, and D8-F1. Additional impacts at these locations will be caused by increased erosion and sedimentation, increased vehicle access, and potential introduction of non-native species. The total area of twin arnica habitat affected on Segments D and F will be approximately 0.7 acre. Impacts at these locations will not result in a significant loss or degradation of habitat for this species and are not considered significant. No mitigation is proposed for impacts to twin arnica.

The combined impacts of the Tuscarora Pipeline Project and the Alturas Transmission Line Project will vary depending on the final route selected for the transmission line. If the proposed project route is selected, the cumulative impact to the species will be equal to the total impact for the Tuscarora Project. However, if Segments D and F of the Madeline Plains Alternatives are selected, the combined impacts will be approximately 0.7 acre higher. Based on a work area 100 feet wide and 29,000 linear feet of twin arnica habitat, the Tuscarora Project will potentially affect nearly 67 acres of twin arnica. The potential cumulative impact is not considered to be significant.

Purple Loco (Astragalus agrestis)

Purple loco currently has no Federal, State, or CNPS status. Purple loco is a low-growing perennial in the Pea Family (Fabaceae) that sprouts from a deeply buried root-crown (Barneby, 1989). The species is found in montane meadows, streambanks, lakeshores, ditches, alkaline playas, and springy areas of sagebrush plains (Barneby 1989). In the project area this mesophytic species was exclusively associated with vernally moist areas of silver sagebrush scrub on the Madeline Plains.

The distribution of purple loco is enormous. Outside of California, the species is more commonly found in the Rocky Mountains from as far north as the Yukon Territory of Canada and as far east as Minnesota and northern Iowa, to Oregon, Nevada, Utah, and Colorado (Barneby, 1989). The species is widespread in the north-temperate regions of Asia from western Siberia to Mongolia (Barneby, 1989). It is considered to be the sole American representative of a small mesophytic group of species within the genus Astragalus that is otherwise only found in Eurasia (Barneby, 1989).

Although the species presently has no formal status in California, it is known from only a few small populations on the Madeline Plains where fewer than 1,000 plants have been observed (BioSystems, 1994a). Five populations were documented by BioSystems for the Tuscarora Pipeline Project containing fewer than 100 individuals. The botanical surveys conducted by WCC for the Alturas Transmission Line Project documented a much larger distribution for one of the populations mapped by BioSystems and found three additional populations distributed in the same vicinity of the Madeline Plains northwest of Termo, California. Four populations occur on Segments E, F, G and I of the Madeline Plains Alternative and support an estimated 2,000 individual plants.

No impacts to purple loco will occur if the proposed project route is selected. However, if the Madeline Plains Alternatives were selected, approximately 5 acres of habitat will be impacted on Segment I and 1 acre of habitat will be affected on Segment F. Types of impacts will include surface disturbance from overland travel and construction of the transmission line structures, and potential introduction of non-native species. Due to the dispersal of individual plants found on the Madeline Plains it will be difficult to avoid the populations. Existing access to the populations will not be substantially altered and the potential for increased erosion and sedimentation is low due to the level terrain. Mitigation for surface removal impacts and potential introduction of non-native species will be implemented as described in Mitigation Measures B-5 and B-8. Specific mitigation plans are presented in the Community and Habitat Restoration Plan for the Proposed Project.

Full implementation of the proposed mitigation for this species will result in a slight but insignificant loss of habitat or populations of this species.

Modifications to the Tuscarora Pipeline Project have eliminated the pipeline's impacts to purple loco and the related cumulative impacts.

Suksdorf's Milkvetch (Astragalus pulsiferae var. suksdorfii)

Suksdorf's milkvetch is a Federal Category 2 candidate and a CNPS List 1B species. Suksdorf's milkvetch is a prostrate species with widely branched stems and inflated, papery pods that have a round cross section. Unlike the related Pulsifer's milkvetch (*Astragalus pulsiferae var. pulsiferae*), which grows from a deeply buried root-crown, Suksdorf's milkvetch grows from a shallowly buried or exposed root-crown (Barneby, 1989).

Suksdorf's milkvetch is found on dry flats associated with scattered western junipers (*Juniperus occidentalis*) or open pine forest. In the project study area this milkvetch was associated with loose, rocky or gravelly volcanic soils. The species occurs as widely scattered individuals or small groups. At one location north of Delta Lake, a single individual was observed more than 2 miles from the nearest known population. The dominant plant species associated with Suksdorf's milkvetch include big sagebrush (*Artemisia tridentata*), low sagebrush (*Artemisia arbuscula*), and black sagebrush (*Artemisia nova*). Southwest of Alturas, Suksdorf's milkvetch occurs on the Alturas volcanic gravels plant community that is associated with three other rare plants: prostrate eriogonum (*Eriogonum prociduum*), doublet (*Dimeresia howellii*), and liliput lupine (*Lupinus uncialis*).

Suksdorf's milkvetch occurs in Lassen, Modoc, Plumas, and Shasta counties in California, the Granite Range of Washoe County, Nevada, and a disjunct occurrence in Klickitat County, Washington. Barneby (1964) identified five populations of Suksdorf's milkvetch and BioSystems (1994b) identified an additional 10 populations for the Tuscarora Pipeline Project. Approximately 22 additional populations were identified by BioSystems and WCC during surveys for the Alturas Transmission Line Project.

BioSystems estimates that the 10 Tuscarora Pipeline populations support over 6,500 plants. The 22 populations documented for the Alturas Transmission Line Project may support more than 3,000 additional plants. Several new populations have also been identified in the Lassen National Forest and east of Adin, California near Ash Valley Road (BioSystems, 1994b).

The Proposed Project route will directly affect approximately 0.7 acre of habitat for the species near Angle Point CØ1 at the junction of Segments A and C , southwest of Alturas. Segment J of the Ravendale Alternative will potentially affect slightly less than 0.3 acre of habitat northwest of Snowstorm Mountain. Impacts at Angle Point CØ1 and Alternative Segment J will include surface removal, increased access, increased erosion and sedimentation, and potential for introduction of non-native plant species. Mitigation for these impacts will be implemented as summarized in Mitigation Measures B-1, B-3, B-6, B-7, and B-8. Specific mitigation plan implementation will be part of the Proposed Project's Community and Habitat Restoration Plan.

Full implementation of the proposed mitigation for this species will result in no net loss of habitat or populations of this species.

Due to the extensive occurrence of this species in the project study area and adjacent areas, impacts to this species were not considered significant in the preliminary analyses for the Tuscarora Pipeline Project (BioSystems, 1994b). However, the limited distribution of habitat for this species suggests that it meets the criteria for consideration under CEQA. Cumulative impacts to this species from both the Tuscarora and Alturas projects will total more than 70 acres of habitat; however, with mitigation this total will be reduced to less than significant levels.

Falcate Saltbush (Atriplex gardneri var. falcata)

Falcate saltbush has no Federal, State, or CNPS status. The species is a small shrub with individual stems that branch from the base but are otherwise unbranched. The stems are gray-scaly and the leaves are gray-green and densely scaly. Falcate saltbush is a member of the Goosefoot Family, which includes a number of more common shrubs typically adapted to alkaline soils of the Great Basin region.

This species occurs on subalkaline soils in chenopod scrub. In the Alturas Transmission Line Project study area it is associated with greasewood (*Sarcobatus vermiculatus*), spiny hop sage (*Grayia spinosa*), and budsage (*Artemisia spinescens*). Falcate saltbush also occurs in Great Basin juniper woodland in Montana and is infrequently found on alkaline soils in sagebrush scrub (BioSystems 1994b).

Regionally, falcate saltbush is known from the Modoc Plateau of California, and the northern Great Basin regions of eastern Oregon, Washington, Idaho, northern Nevada, and northern Utah (Abrams, 1944). Three populations of the species were documented by BioSystems for the Tuscarora Pipeline Project. One of these populations is located within the alignment of segment L of the Alturas Transmission Line

Project north of Mud Lake. WCC botanists confirmed the presence of this population and also documented a fourth population.

No impacts to falcate saltbush are anticipated. Due to the compact size and limited distribution of the populations potential impacts to the species will be avoided by locating structures and overland access away from known populations. No potential for increased vehicle access exists due to the proximity of the populations to an existing highway corridor in Secret Valley. No potential for increased erosion or sedimentation exists because of the nearly level terrain where the species is found.

There is no potential for cumulative impacts since neither of the proposed projects will affect the species.

Pine Creek Evening Primrose (Camissonia boothii var. alyssoides)

Pine Creek evening primrose is a CNPS List 4 species that has no Federal, or State status. The species is a small annual herb generally less than 4 inches high that branches from its base into several stalks (Abrams, 1951). Leaves of the Pine Creek evening primrose are bright green and rarely exceed 1.5 inches long (Hickman, 1993). The species is typically found on sandy soils associated with big sagebrush scrub.

This species is common during favorable springs such as in Lassen County in 1993 (Skinner and Pavlik, 1994). In the project area Pine Creek evening primrose was most commonly associated with big sagebrush scrub and sandy substrates. However, two occurrences of the species were identified on volcanic vertisol soils associated with northern juniper woodland and low sage scrub. More typically, associated species include greasewood (*Sarcobatus vermiculatus*), cheat grass (*Bromus tectorum*), big sagebrush (*Artemisia tridentata*), and wooly fish hooks (*Ancristocarphus filagineus*).

Pine Creek evening primrose occurs from northeastern California's Modoc Plateau to western Utah, southern Idaho, and Nevada (Hickman, 1993). In the project study area, the species was observed from as far north as Segment K on the Snowstorm Mountain USGS 7.5 minute quadrangle to as far south as Segment L7-L8, east of Shaffer Mountain. Ten populations were identified by WCC botanists in the study corridor representing an estimated total of nearly 3,000 plants. BioSystems botanists identified at least 18 populations consisting of an estimated 10,000 plants.

Potential impacts to Pine Creek evening primrose that will result from the proposed project include surface disturbance of 0.82 acre of habitat and introduction of non-native species (see Table C.3-9 in Section C.3.2.2.1 of the EIR/EIS). The species was not observed on any of the alternative alignments. However, surveys for this species will not be completed for the East Secret Valley Alternative until June 1995. Avoidance is difficult due to the size of the populations and the dispersal of individual plants of this species. However, the size and number of extant populations observed in the study corridors for the

two projects suggest that this species does not qualify for review under CEQA as a rare plant, and the impacts are not considered to be significant. Therefore, no mitigation is proposed.

The Tuscarora Pipeline Project and the Alturas Transmission Line Project will both affect Pine Creek evening primrose. No estimate of the impacts associated with the Tuscarora Project were available to determine the total area of existing habitat that will be affected by the two projects. BioSystems (1994b) estimated that approximately 10,000 linear feet of habitat are crossed by the pipeline. If the pipeline work area is 100 feet wide, a maximum of 23 acres of habitat might be affected with the combined loss totaling nearly 24 acres of existing habitat. The cumulative impact is not considered significant based on the distribution and abundance of the species within the project vicinity.

Nelson's Evening Primrose (Camissonia minor)

Nelson's evening primrose is a CNPS List 4 species that has no Federal or State status. The species is a small annual herb generally less than 4 inches high that branches from its base into several erect stems (Abrams, 1951). Basal leaves of Nelson's evening primrose are largest and rarely exceed 1 inch long (Abrams, 1951). The flowers are small, yellowish, and less than 0.25 inch in diameter.

This species typically blooms from May until June. Like Pine Creek evening primrose, this primrose species is found growing in sandy soils associated with Great Basin shrub communities. In the project area vicinity, Nelson's evening primrose was associated with big sagebrush (*Artemisia tridentata*), greasewood (*Sarcobatus vermiculatus*), basin wild rye (*Leymus cinereus*), and bud sage (*Artemisia spinescens*). Associated plant communities included big sagebrush scrub and chenopod scrub. All of the populations occurred on sandy, alkaline soils.

Nelson's evening primrose is known to occur in Lassen and Modoc counties in California. Elsewhere it is known in eastern Washington, eastern Oregon, Nevada, and Idaho (Abrams, 1951). In the project study corridor this evening primrose was observed at only three locations. Two populations representing a total of approximately 340 plants were observed on Segment O and one population representing approximately 300 plants was observed on Segment Q. Segments O and Q are part of the proposed project route; no populations of Nelson's evening primrose were observed on the alternative route alignments. Surveys for the Tuscarora Pipeline Project identified approximately 28 populations of this species in the pipeline project area; however, the size of these populations was not recorded. Based on the size of the populations observed by WCC botanists, it is estimated that the 28 populations may support more than 3,000 plants.

The Alturas Transmission Line Project will avoid impacts to Nelson's evening primrose on Segment O by locating the structures outside of the known populations. Surface disturbance caused by overland travel will be avoided on Segment O by using existing access roads in these locations. No impacts from

increased access or erosion and sedimentation are anticipated on this Segment since no new access routes will be created in these sections and the level terrain will minimize erosion potential.

Approximately 0.23 acre of existing habitat for Nelson's evening primrose will be impacted by surface disturbance on Segment Q between Angle Points OØ5 and QØ1. Associated impacts will include increased access, erosion and sedimentation, and potential for non-native plant introduction. Mitigation for these impacts will be implemented as described in Mitigation Measures B-5, B-6, B-7, and B-8 in Section C.3.2.2.2 of the EIR/EIS. Additional detailed mitigation plans will be required in the Community and Habitat Restoration Plan for the Proposed Project.

Full implementation of the proposed mitigation for this species will result in no net loss of habitat or populations of this species.

Eight populations identified in the study area of the Tuscarora Pipeline Project and two populations identified in the study area for the Alturas Transmission Line Project will be avoided. However, the data provided by BioSystems (1994b) are inconsistent and do not clearly indicate the remaining impacts to the species. Due to the size and number of populations that have been identified for this species it is not likely that the combined impacts of the two projects will cause a significant decline in the distribution or populations of this species.

Doublet (Dimeresia howellii)

Doublet is a CNPS List 4 species with no Federal or State status (Skinner and Pavlik, 1994). Doublet is a prostrate herbaceous annual in the Sunflower Family that rarely exceeds 4 inches in diameter. This is the only species in the genus *Dimeresia*. The flower heads of this species are clusters of two to three tiny white, pink, or purplish disk flowers (Eastman, 1990). The flower heads sit almost directly on top of the basal leaves that frame the inflorescences. The stems of doublet are fleshy and the base of the leaves have entangled, cobwebby hairs (Eastman, 1990).

Doublet is found on barren areas of dry, gravelly, or rocky soil at elevations between 3,900 and 9,500 feet (Cronquist, 1994). In the Alturas area, this species occurs on volcanic gravels on the crests of hills and ridges. Associated plant communities are northern juniper woodlands and big sagebrush scrub. Populations in the study area were also associated with other rare plants including liliput lupine (*Lupinus uncialis*), prostrate buckwheat (*Eriogonum prociduum*), and Suksdorf's milkvetch (*Astragalus pulsiferae var. suksdorfii*), which also occur on the volcanic gravel areas.

This species is known from Lassen and Modoc counties in California. Elsewhere it occurs in central and southeastern Oregon, northern Nevada, and Idaho (Cronquist, 1994; Abrams and Ferris, 1960). Doublet is listed as "threatened" in Idaho (Skinner and Pavlik, 1994). The populations identified in this study were located 1 to 4 miles southwest of Alturas on Segments A and C of the Proposed Project route and

Alternative Segment B. A total of eight populations was identified that represent an estimated 900 plants. Two populations were located between Angle Points AØ5 and AØ6, and four populations were located between Angle Points AØ6 and CØ1. One population was identified on Segment C between Angle Points CØ1 and CØ2. Only one population, composed of 75 plants, was identified on Alternative Segment B.

The Alturas Transmission Line project will avoid impacts to doublet on Segment C by locating the structures outside of the single known population. Surface disturbance caused by overland travel will be avoided on Segment C by using an existing access road at this location. No impacts from increased access or erosion and sedimentation are anticipated on this Segment since no new access routes will be created in these sections and the level terrain will minimize erosion potential.

Approximately 0.11 acre of existing habitat for doublet will be impacted by surface disturbance on Segment A. The impact will occur at the convergence point for Segments A and B represented by Angle Point BØ8. Therefore, this impact is identical to the impact for Alterntive Segment B. It was not possible to avoid this impact due to the terrain at this location, which necessitates the placement of a structure at this location. Associated impacts will include increased access, erosion and sedimentation, and potential for non-native plant introduction. Mitigation for these impacts will be implemented as described in Mitigation Measures B-5, B-6, B-7, and B-8 in Section C.3.2.2.2 of the EIR/EIS. Additional detailed mitigation plans will be specified in the Community and Habitat Restoration Plan for the Proposed Project.

Full implementation of the proposed mitigation for this species will result in no net loss of habitat or populations of this species.

All impacts on this species have been avoided by re-routing of the Tuscarora Pipeline Project alignment. Therefore, the cumulative impacts of the two projects will be identical to the impacts described for the Alturas Transmission Line project.

Volcanic Daisy (Erigeron elegantulus).

Volcanic daisy is a CNPS List 4 species with no State or Federal status. This species is a mat-forming perennial herb that grows from a woody taproot. Stems branch from the root crown and are between 1 and 6 inches tall (Abrams, 1960). This species is similar to *E. linearis* but can be differentiated by its more slender, delicate foliage (Cronquist, 1994). Blue, pink, or white flowers appear between March and August on slender stems that extend above the height of the leaves. This species was first described from samples collected in Dixie Valley in Lassen County, California.

Habitat for this species is open, rocky places and especially volcanic rocks (Cronquist, 1994). Associated plant communities include alpine boulder fields, various types of Great Basin shrub communities, pinyon and juniper woodlands, and subalpine conifer forest.

Habitat for this species is open, rocky places and especially volcanic rocks (Cronquist, 1994). Associated plant communities include alpine boulder fields, various types of Great Basin shrub communities, pinyon and juniper woodlands, and subalpine conifer forest.

This species of *Erigeron* occurs in Lassen, Modoc, Shasta, and Siskiyou counties in California. The species is also known from Oregon. Volcanic daisy was documented at nine sites in the project study corridor. Alternative Segment D had six sites, Segment K of the Proposed Project route had two sites, and Segment J of the Ravendale Alternative had one site. The total number of plants documented from the study corridor was approximately 1,200. BioSystems documented an additional 15 populations from as far north as near Perez in Siskiyou County to near Termo in Lassen County. Some of the populations documented by Tuscarora had more than 5,000 plants (BioSystems, 1994b). Populations of this species also occur at the Ash Valley Research Natural Area, located 10 miles west of Madeline, California, administered by BLM. Based on the widespread distribution and abundance of this species in northeastern California, it is concluded that this species does not meet the criteria for evaluation as a rare plant under CEQA.

Volcanic daisy will be entirely avoided on the Proposed Project route; however, populations on Alternative Segment D between Angle Points DØ3 and DØ8 will be impacted by surface removal for overland travel and structure placement. Direct impacts will potentially cause the loss of approximately 400 to 800 individual plants. Potential indirect impacts include increased vehicle access, erosion and sedimentation, and non-native plant introduction. Direct impacts to this species are not considered to be significant given the widespread distribution and abundance of this species and its habitat in northeastern California. Therefore, species-specific mitigation is not proposed. However, mitigation for introduction of non-native plants, erosion and sedimentation, and the creation of overland access to these areas is considered significant and mitigation is proposed for those impacts. Mitigation will be implemented as described in Mitigation Measures B-1, B-6, B-7, and B-8. More specific details of the mitigation plans are required in the Community and Habitat Restoration Plan for the Proposed Project.

Full implementation of the proposed mitigation for this species may result in insignificant net losses of habitat or populations of this species.

Cumulative impacts to this species are not considered significant because of the small number of individual plants affected relative to the size and distribution of the species.

Clay-Loving Buckwheat (Eriogonum collinum)

Clay-loving buckwheat has no State, Federal, or CNPS List status. This species was considered for inclusion in the fifth edition of the CNPS Inventory but was rejected because it is was inadvertantly omitted from the Jepson Manual for undetermined reasons and believed to not occur in California (Hickman, 1993).

Clay-loving buckwheat is an annual herb with one to several openly branched stems from its base that are up to 28 inches tall and have tufts of woolly hairs near the base when young (BioSystems, 1994b). The leaves are basal, roundish, and densely white-tomentose below and lacking much hair on top. The flowers are white to pinkish-yellow or yellow.

This plant is found on volcanic clay soils (vertisols) associated with Great Basin shrub communities (BioSystems, 1994b). Associated plant communities include big sagebrush scrub, rabbitbrush scrub, greasewood scrub (chenopod scrub), and northern juniper woodland. It was observed in the project vicinity growing in small patches on upland soil mounds and beds of abandoned dirt roads (BioSystems, 1994b).

This species is known only from Lassen County in California, but it is more widespread in Nevada. BioSystems (1994b) documented eight populations in the Tuscarora Project's study corridor. One of these populations was also located in the study corridor for the Alturas Project, east of Termo, California.

Due to the small size of the population on Segment K, east of Termo, this species will be avoided. Due to the terrain, the proximity of the Tuscarora Pipeline corridor, and the existing quality of this site, indirect impacts due to increased vehicle access, erosion and sedimentation, and introduction of non-native plants will not be significant. Avoidance of this population will consist of placing structures and overland travel routes outside of the limits of the known population and clearly marking the site to avoid inadvertent encroachment by vehicles.

Potential impacts will be avoided and will not contribute to cumulative impacts to this species.

Prostrate Buckwheat (Eriogonum prociduum)

Prostrate buckwheat is a Federal Category 2 candidate and a CNPS List 1B species. This species has been placed on the watch list in Nevada and is a candidate for State listing in Oregon.

This species of buckwheat was first described in 1968 as *Eriogonum chrysops*; however, in 1972 it was separated from *E. chrysops* and given its present taxonomic identity (Reveal, 1972). Prostrate buckwheat is a low, matted herbaceous perennial that grows from an above ground woody root-crown (Reveal, 1972). The mat formed by the plant is 4 to 12 inches in diameter. The leaves of the species are basal and persist, which results in old leaf-blades and bases covering the upper part of the root-crown. Leaves have fine white hairs that densely cover the leaf surfaces. Inflorescences form a head at the top of an erect, unbranched stem 1 to 3.5 inches tall. The flowers are yellow with reddish-brown midribs and bases.

Prostrate buckwheat is found on dry, rocky, or gravelly volcanic soils that have very low vegetation cover. Associated plant communities are northern juniper woodland and big sagebrush scrub. In the

project area the species is associated with several other rare plants including Suksdorf's milkvetch (*Astragalus pulsiferae var. suksdorfii*), liliput lupine (*Lupinus uncialis*), and doublet (*Dimeresia howellii*). Other associated species include rough eyelash (*Blepharipappus scaber*), low sagebrush (*Artemisia arbuscula*), ball-head gilia (*Gilia congesta var. congesta*), and western juniper (*Juniperus occidentalis*).

This species of *Eriogonum* is found in Lassen and Modoc counties in California. Elsewhere, it is found in Washoe County, Nevada, and Lake County, Oregon (Schoolcraft, 1985). Populations of this species occur in the Ash Valley Research Natural Area administered by BLM and located in Lassen County approximately 10 miles west of Madeline, California (Schoolcraft, 1988). Surveys of the project study corridor by WCC botanists identified four previously unidentified populations southwest of Alturas on volcanic gravels. All of the populations in the study corridor are located on Segment A of the Proposed Project route between Angle Points AØ4 and CØ1. Populations range in size from two plants near Angle Point AØ5 to more than 500 plants adjacent to Angle Point CØ1. A total of approximately 612 plants was observed in the study corridor in 1994.

No impacts on prostrate buckwheat are anticipated as a result of the Proposed Project. Prostrate buckwheat populations in the study area are compact and occupy small areas, which make them easy to avoid. All of the populations in the study area are located on low hills, which also make them less susceptible to erosion/sedimentation impacts. Potential threats include structure placement and construction at Angle Points AØ5 and CØ1 as well as surface disturbance caused by overland travel or increased vehicle access. Potential project impacts on this species will be avoided by moving Angle Point AØ5 to the east and by clearly designating the structure locations and overland travel routes in the four areas where the buckwheat occurs. Potential for introduction of non-native species will be mitigated by implementation of Mitigation Measure B-8 described in the EIR/EIS.

Full implementation of the proposed mitigation for this species will result in no net loss of habitat or populations of this species.

No cumulative impacts are associated with this species since potential impacts have been avoided. No populations of this species were identified in the study corridor for the Tuscarora Pipeline Project (BioSystems, 1994b).

Altered Andesite Buckwheat (Eriogonum robustum)

Altered andesite buckwheat is a Federal Category 2 candidate with no State status. Since it is known only from Nevada, it has no CNPS List status. Reveal (1985) has described this taxon as a variation of Lobb's buckwheat (*Eriogonum lobbi var. robustum*). The altered andesite buckwheat is differentiated from Lobb's buckwheat by its larger leaves, larger flowers, and erect flowering stems. The species possesses a low, spreading, compact growth form and large flowering stems bearing distinctive white to rose-colored flowers.

This species of buckwheat is endemic to Nevada's Washoe and Storey counties where it is found only on soils derived from altered andesites. Soils that form on altered andesites are very acidic and are low in phosphorus and other essential plant nutrients (Billings, 1950). A consequence of this unique chemistry is the exclusion of most zonal vegetation types from these soils (Billings, 1950). A unique feature of these soils is the disjunct presence of montane conifers such as ponderosa pine (*Pinus ponderosa*) in areas that do not support other trees. It is likely that the altered andesite buckwheat tolerates these soils but is unable to compete with the great basin shrubs that occur on the unaltered soils nearby.

Altered andesite buckwheat is limited to approximately 20 sites in the region around Reno, Nevada (Kuyper, 1994). Three populations with a combined total of approximately 118 plants were observed in the study corridor by WCC botanists. Two of these populations were located on Segment Y between Angle Points XØ9 and YØ1, and the third was located on Segment X between Angle Points XØ9 and X10. Potential impacts will not differ significantly between the East Proposed Project route and the X-East alternative segment.

No surface removal or disturbance impacts to altered andesite buckwheat are anticipated. All three of the populations in the project area are small and will be avoided by placement of the structures and overland travel routes outside of altered andesite plant communities with known populations of this species. Potential for introduction of non-native species, increased erosion and sedimentation, and increased vehicle access will be mitigated as described in Mitigation Measures B-6, B-7, and B-8. Complete, species-specific mitigation implementation plans are required in the Community and Habitat Restoration Plan for this project.

Full implementation of the proposed mitigation for this species will result in no net loss of habitat or populations of this species in the short term. However, long-term impacts of degradation, fragmentation, and isolation of the populations may be increased due to creation of a new utility corridor in this area. Two of the three populations are presently impacted by uncontrolled vehicle access. The proposed mitigation to reduce potential degradation of the populations by increased vehicle access will not be completely successful without implementation of additional protective measures. Specific measures will be determined in consultation with the USFWS and Toiyabe National Forest, which owns most of the land where the populations occur.

Existing populations of this species have been fragmented and isolated due to the urban growth in the Reno area. Without mitigation, the vehicle traffic, overland travel, structure construction, and other indirect impacts associated with the Proposed Project will compound the existing problems. Implementation of the proposed mitigation measures for this species will reduce the potential cumulative impacts to less than significant levels.

Cusick's Stickseed (Hackelia cusickii)

Cusick's stickseed is a CNPS List 4 species with no Federal or State status. This species is a member of the Borage Family characterized by a distinctive inflorescence that coiled inward like the neck of a violin. Cusick's stickseed is an herbaceous perennial with several erect stems 6 to 20 inches tall originating from a root-crown. The root-crown is typically hidden by an accumulation of old leaf bases. The entire plant is densely covered with fine hairs and has narrow leaves 2 to 4 inches long. Flowers are a delicate light blue with a yellowish or whitish eye.

This species is also known by the common name "juniper forget-me-not," which alludes to the preferred habitat of this species. Cusick's stickseed occurs in juniper woodlands under the canopy of mature western junipers (*Juniperus occidentalis*) and mountain mahogany (*Cercocarpus ledifolius*). It is inferred that this species requires the mesic conditions provided by the shade and accumulated litter beneath the trees (Cronquist et al., 1981).

Cusick's stickseed occurs in Lassen, Modoc, and Siskiyou counties in California. Elsewhere, the species occurs in Nevada and eastern Oregon. The species was first described from samples collected in the Logan Mountains of eastern Oregon. In the study area of the Proposed Project, this species was observed from as far north as Segment C between Angle Points CØ4 and CØ5. The most southerly occurrence of the species was observed at the northern margin of the Madeline Plains on Alternative Segment D between Angle Points DØ4 and DØ5. A total of more than 5,000 individual plants was found in at least 16 populations. The most extensive populations occurred on Segment D north and south of Hollbrook Canyon. Surveys for the Tuscarora Pipeline Project found 32 separate populations but did not document the sizes of the populations.

Although Cusick's stickseed has specific habitat requirements, the area of potential habitat adjacent to the project study corridor is very large. Based on the widespread distribution of this species in the project vicinity and the large number of individuals documented by WCC botanists, it is concluded that this species does not satisfy the criteria for evaluation as a rare plant under CEQA. The estimates of population size were recorded from a 660-foot-wide corridor; total population size outside of the corridor is much larger.

The Proposed Project route would impact approximately 2 acres of habitat for this species on Segment C between Angle Points CØ4 and CØ6, north of Likely Mountain, and between Angle Points CØ8 and C10, south of Likely Mountain. Approximately five populations and fewer than 1,400 plants will be impacted by surface removal (blading) to permit overland travel in rough terrain. The area of impact is estimated based on an average width of disturbance of 15 feet. Additional impacts will include increased vehicle access following construction and potential for introduction of non-native plant species. Due to the specific habitat requirements of this species, most of the potential impacts due to surface removal will

be avoided by placement of structures and overland access routes in open areas away from mature junipers.

Impacts to Cusick's stickseed are not considered significant. However, mitigation to reduce the potential for impacts related to surface removal of natural plant communities, increased vehicle access, erosion and sedimentation, and introduction of non-native plants will be implemented as described in Mitigation Measures B-1, B-6, B-7, and B-8. Specific mitigation plans are required in the project's Community and Habitat Restoration Plan. Full implementation of these mitigation measures will reduce potential impacts to this species.

Selection of Alternative Segment D would affect 11 populations consisting of more than 4,200 individual plants. As described above, these impacts are not considered significant but would be reduced by implementation of the mitigation measures for associated resources.

Cumulative impacts cannot be adequately evaluated based on the limited data for this species summarized in the Tuscarora Project botanical resource reports (BioSystems, 1994b).

Henderson's Lomatium (Lomatium hendersonii)

Henderson's lomatium is a CNPS List 2 species with no Federal or State status. It is considered a "special interest" plant by Modoc National Forest (BioSystems, 1994b).

This perennial species is a member of the Carrot Family and grows from a large, shallow tuber (Abrams, 1951). Above ground the plant reaches 3 to 10 inches in height with compound leaves and deep yellow flowers in a compound umbel (Abrams, 1951). This species can be confused with *L. canbyi* but is most easily distinguished by its irregular-shaped tuber, which is unlike the more regular, almost sphere-shaped tuber of *L. canbyi*.

Henderson's lomatium is found on sandy or silty clay soils with 50-80% rock cover (BioSystems, 1994b; Abrams, 1951). Associated plant communities are big sagebrush scrub and juniper woodland (BioSystems, 1994b; Skinner and Pavlik, 1994). In the project area, associated species include Lewis's lomatium (*Lomatium triternatum*), Bolander's yampah (*Perideridia bolanderi*), Idaho fescue (*Festuca idahoensis*), Hood's phlox (*Phlox hoodii var. canescens*), and low sagebrush (*Artemisia arbuscula*). In Modoc County the species was often observed in shallow drainages with large rocks and cobbles (BioSystems, 1994b). This species of lomatium typically is found at elevations between 4,600 and 6,200 feet (BioSystems, 1994b).

Henderson's lomatium occurs in Lassen, Modoc, and Plumas counties in California. Elsewhere, it occurs in Idaho, Nevada, and Oregon. In the project area it was found at 10 locations consisting of an estimated

total of more than 25,500 plants (BioSystems, 1994b). All of the observed occurrences of this species were located on Segment C of the Proposed Project route between Angle Points CØ3 and CØ6.

Based on the size of this species' distribution in California and the associated size of its populations, this taxon appears to be fairly abundant and widespread and is unlikely to meet the criteria for consideration under CEQA.

This lomatium species will be impacted on Segment C by surface removal, increased vehicle access, and potential introduction of non-native plant species. Total area of impact will be approximately 2.5 acres. Impacts to this species are not considered significant because this species is not a rare plant as defined by CEQA. However, mitigation to reduce the potential for impacts related to surface removal of natural plant communities, increased vehicle access, and introduction of non-native plants will be implemented as described in Mitigation Measures B-1, B-6, and B-8. Specific mitigation plans are required in the project's Community and Habitat Restoration Plan. Full implementation of these mitigation measures will reduce potential impacts on this species.

Cumulative impacts of the Proposed Project and the Tuscarora Pipeline Project could total more than 3.5 acres of habitat, assuming that the pipeline will affect 448 linear feet of habitat in a swath 100 feet wide (BioSystems, 1994b). The number of plants destroyed cannot be accurately estimated based on the available information; however, it is not likely to be significant based on the known size and distribution of the species.

Raven's Lomatium (Lomatium ravenii)

Raven's lomatium is a Federal Category 3c candidate for listing and a CNPS List 4 species. This lomatium species is listed as "endangered" by the State of Oregon.

This species occurs on clay soils of basins. Raven's lomatium is typically associated with Great Basin shrub communities such as big sagebrush scrub or silver sage scrub. Common associated species in the project area include big sagebrush (*Artemisia tridentata*), rubber rabbitbush (*Chrysothamnus nauseosus*), smooth horsebrush (*Tetradymia glabrata*), and squirreltail grass (*Elymus elymoides*).

In California, Raven's lomatium is known only from Lassen County. Elsewhere, it occurs in Idaho, Nevada, Oregon, and Utah. In the project corridor it was observed on the Madeline Plains portions of Segments E and K, and Alternative Segment J. Surveys for the Tuscarora Project also identified a population of this species north of Mud Flat in Secret Valley. Population sizes ranged from 20 to over 30,000 plants.

Based on the size of this species' distribution in California and the associated size of its populations, this taxon appears to be fairly abundant and widespread and is unlikely to meet the criteria for consideration under CEQA.

This lomatium species will be impacted on Segments E and K by surface removal, increased vehicle access, and potential introduction of non-native plant species. Total area of surface removal impact for the Proposed Project route will be approximately 2.7 acres. Alternative Segment J would have a surface removal impact of 2.7 acres of species habitat. However, impacts to this species are not considered significant because this species is not a rare plant as defined by CEQA. Mitigation to reduce the potential for impacts related to surface removal of natural plant communities, increased vehicle access, and introduction of non-native plants will be implemented as described in Mitigation Measures B-1, B-6, and B-8. Specific mitigation plans are required in the project's Community and Habitat Restoration Plan. Full implementation of these mitigation measures will reduce potential impacts on this species.

Cumulative impacts of the Proposed Project and the Tuscarora Pipeline Project could total more than 90 acres of Raven's lomatium habitat, assuming that the pipeline will affect 39,162 linear feet of habitat in a swath 100 feet wide (BioSystems 1994b). The number of plants destroyed cannot be accurately estimated based on the available information; however, it is not likely to be significant based on the known size and distribution of the species.

Liliput Lupine (Lupinus uncialis)

Liliput lupine has no Federal, State, or CNPS List status. This species is a very small, low-growing annual herbaceous plant in the Pea Family that forms a dense clump generally less than 2 inches in diameter. The small pea-like flowers of the plants are bicolored, with petals that are white or lilac-tinged and tipped with purple.

Liliput lupine is associated with open sites in sagebrush or pinyon-juniper woodland. Typical substrates are limestone, rhyolite, volcanic ash, and sinter near hot springs. The elevation range of the species is 4,600 to 6,900 feet. Scattered individuals are generally surrounded by bare ground. Associated species in the project area include spring whitlow grass (*Draba verna*), Hood's phlox (*Phlox hoodii var canescens*), big sagebrush (*Artemisia tridentata*), and spring gold (*Crocidium multicaule*).

The distribution of the species spans northern and central Nevada to southeastern Oregon and Idaho. The species was not known from California prior to the 1993 surveys for the Tuscarora Pipeline Project. Surveys by BioSystems and WCC have identified a total of 21 separate populations in the vicinity of Alturas, California, that support an estimated total of more than 4,000 plants. The largest population, identified by BioSystems, consisted of more than 1,000 plants while the smallest population, documented by WCC, consisted of a single plant. Due to the limited distribution of liliput lupine in California, the species is considered a rare plant under CEQA and is eligible for CNPS List 2 status.

Three populations occur in the Alturas Transmission Line Project study corridor. All of the populations are located on Segment A between Angle Points AØ4 and AØ6. Liliput lupine populations in the study area are compact and occupy small areas, which make them easy to avoid. All of the populations in the study area are located on low hills, which also make them less susceptible to erosion/sedimentation impacts. Potential threats include structure placement and construction at Angle Point AØ5 and surface disturbance caused by overland travel or increased vehicle access. Potential project impacts to liliput lupine will be avoided by moving Angle Point AØ5 to the east and by clearly designating the overland travel routes in the three areas where the lupines occur.

No cumulative impacts are associated with this species since potential impacts would be avoided.

Dwarf Lousewort (Pedicularis centranthera)

Dwarf lousewort is a CNPS List 2 species with no Federal or State status in California. This species is currently on a review list in Oregon (Skinner and Pavlik, 1994).

This lousewort is a low-growing perennial herb in the Snapdragon Family. The dwarf lousewort grows from a tuberous root and does not exceed 5 inches in height (Abrams, 1951). Like other louseworts, this species probably parasitizes the roots of another species. The stems are exceeded in height by the nearly compound leaves. The whitish margins of the leaves are crenate, dentate, or lobed. The inflorescence is a spike-like raceme that is generally shorter than and partly hidden by the leaves. The corolla is pale purple with a darker tip.

In the project area, dwarf lousewort occurs on alluvial sites on vernally moist clay soil. Associated species include big sagebrush (*Artemisia tridentata*) and greasewood (*Sarcobatus vermiculatus*).

In California this species is known to occur only in Lassen County. Elsewhere, it occurs in north and eastern Arizona, the northern half of Nevada, southeastern Oregon, western Colorado, central and western New Mexico, and western and southern Utah (Cronquist et al., 1984). In the project area dwarf lousewort was observed in only one population on Segment L between Angle Points LØ5 and LØ6. The size of the population was estimated to be 300 plants. The Tuscarora Project documented the same population but estimated its size at around 120 plants. No other populations of this species were observed in the study corridors for either project. Six other populations are also known from the Karlo USGS 7.5 minute quadrangle.

The dwarf lousewort population in the study area is compact and occupies a very small area, which makes it simple to avoid. This population is located on relatively level terrain, which makes it less susceptible to erosion/sedimentation impacts. Potential threats include structure placement and construction. Surface disturbance caused by overland travel and increased vehicle access will be minimized because of the proximity of the Highway 395 corridor and the Tuscarora Pipeline corridor, which will make overland

travel unnecessary. Potential project impacts to the dwarf lousewort will be avoided by placement of the transmission line structures outside of the population and clearly marking this area during construction to prevent unanticipated encroachment by vehicles. Mitigation for potential introduction of non-native species will be implemented as described in Mitigation Measure B-8.

No cumulative impacts are associated with this species since potential impacts would be avoided.

Spiny Milkwort (Polygala subspinosa)

Spiny milkwort is a CNPS List 2 species with no State or Federal status.

This species is a perennial herb to subshrub with branched, glabrous or puberulent stems that is usually less than 10 inches in height (Abrams, 1951). The leaves are short-petioled, obovate, or elliptic, and have a long-tapered base. The inflorescence is a raceme and is thorn-tipped. The flowers are bilaterally symmetrical and have pink petals and petal-like sepals. The beak of the keel petal is yellow or greenish.

This species occurs as scattered individual plants in gravelly soils in the Great Basin (BioSystems, 1994b). Associated plant communities include big sagebrush scrub, rabbitbrush scrub, and northern juniper woodland. In the project area this species was found in transitions between big and low sagebrush scrub and in shallow ephemeral drainages on alluvium (BioSystems, 1994b). The species frequently grows between and over rocks.

In California, spiny milkwort is known only from Lassen County, but it also occurs in western Nevada, northern Arizona, New Mexico, Utah, and western Colorado In the project corridor it was found on Segment L between the northern end of Secret Valley to the junction with Segments M and N west of Schaffer Mountain. An estimated total of nearly 3,800 plants was associated with 12 populations. BioSystems (1994b) also documented 11 populations of over 560 plants.

Surface removal will impact 3.04 acres of habitat for this species on Segment L of the proposed route. All of the impacts will occur between Angle Points LØ7 and LØ9. Similar impacts would probably be associated with the East Secret Valley Alternative but these cannot be quantified until spring surveys are completed in 1995. Other potential impacts are associated with increased access and introduction of non-native species. Avoidance of these populations will be difficult because of the dispersal of individual plants within the populations. Mitigation for these impacts will be implemented as described in Mitigation Measures B-1, B-6, and B-8. Specific mitigation plans are required in the Community and Habitat Restoration Plan for the Proposed Project.

Full implementation of the proposed mitigation for this species will result in no net loss of habitat or populations of this species.

Total cumulative impacts to this species could be greater than 12 acres of existing habitat. However, mitigation for impacts of the Alturas Project will reduce the cumulative impact to less than significant levels.

Lance-Leaved Scurf-Pea (Psoralidium lanceolatum)

Lance-leaved scurf-pea has no State, Federal, or CNPS status. This species is a perennial herb that grows from a creeping rootstock (Abrams, 1944). Stems and leaves are covered with coarse, protruding glands and occasionally short hairs (Barneby, 1989). Erect or suberect stems branch from the base and are between 4 and 24 inches in height (Abrams, 1944). Inflorescences are short axillary racemes with white to purple-blue petals (BioSystems, 1994b).

This species of scurf-pea is found in clearings on sandy soils associated with big sagebrush scrub, winter fat (*Krascheninnikovia lanata*), and partially stabilized or stabilized sand dune communities. Outside of California, this species is commonly found on alluvial plains. This was also documented from disturbed sites in the study areas for both projects. Plant species that occur with lance-leaved scurf-pea include big sagebrush (*Artemisia tridentata*), rubber rabbitbush (*Chrysothamnus nauseosus*), bitterbrush (*Purshia tridentata*), cheat grass (*Bromus tectorum*), and freckled milkvetch (*Astragalus lentiginosus var. floribundus*).

In California, lance-leaved scurf-pea is found only in Lassen County, but it occurs elsewhere from eastern Oregon and Washington to Saskatchewan, Wyoming, and Texas (Barneby, 1989). It is a common species in most of western North America and the Great Basin (Barneby, 1989). In the project study corridor, this species was documented from five separate locations: three on Alternative Segment P and two on Segment Q of the Proposed Project route. All of the occurrences were located near the southern margin of Honey Lake Valley on stabilized sand dunes and alluvial deposits at the foot of the Fort Sage Mountains. An estimated total of 2,900 plants was observed for these populations. Surveys for the Tuscarora Pipeline Project identified three populations with a total of approximately 5,500 plants (BioSystems, 1994b). Because of the proximity of the two project corridors in this area, it is likely that some of the identified populations probably overlap.

Data collected by WCC and BioSystems indicate that lance-leaved scurf-pea is restricted to the extreme southern margin of the Honey Lake Valley. Based on the documented abundance and distribution of this species in California, this taxon will qualify for review under CEQA.

The Proposed Project route would cause surface disturbance impacts to 0.21 acre of lance-leaved scurf-pea habitats on Segment Q. Impacts will occur between Angle Points OØ5 and QØ1 and will be caused by overland travel. Other potential impacts would include increased vehicle access, increased erosion and sedimentation (primarily wind erosion), and possible introduction of non-native species. Overland travel would also cause surface disturbance impacts to 1 acre of habitat for this species on Alternative

Segment P between Angle Points OØ5 and PØ1. These impacts are considered significant and will be mitigated by implementing Mitigation Measures B-5, B-6, B-7, and B-8. Specific mitigation plans are required in the Community and Habitat Restoration Plan for this project.

Full implementation of the proposed mitigation for this species will result in no net loss of habitat or populations of this species. Implementation of the proposed mitigation measures will also reduce potential cumulative impacts to less than significant levels.

Holmgren's Skullcap (Scutellaria holmgreniorum)

Holmgren's skullcap is a Federal Category 3c candidate for listing and a CNPS List 3 species. Taxonomic questions regarding the validity of this species are responsible for the Federal Category 3c status and resulted in downgrading of the CNPS status from 1B to 3 in the last revision of the CNPS Inventory (Skinner and Pavlik, 1994). The Jepson Manual (Hickman, 1993) combined this species with *Scutellaria nana*; however, other authors still accept it as a valid taxon (Cronquist et al., 1984).

This skullcap species is a perennial herb that grows from a deep, tuberous-thickened rhizome (BioSystems, 1994b; Cronquist et al., 1984). Several stems typically branch from the base that are 4 to 8 inches long. Herbage is soft-hairy with spreading hairs that are sometimes gland-tipped. The plants bear flowers from the axils of leaf-like bracts. Flowers have a two-lipped calyx with an upper lip that bears a prominent hoodlike appendage, and a two-lipped corolla that is white with purple tints on the upper lip.

Holmgren's skullcap is found in scattered patches in shallow, friable, volcanic clay soils (vertisols). These sites have a high percentage of basalt rock. Most of these soils correspond to the Tunnison series which is formed from andesite or basalt on relatively level plateaus (SCS, 1994). These soils have a very high clay content which shrinks or swells with changes in moisture content creating large cracks as the soils dry out during the summer. During the dry season, surface soil granules slough into the cracks (Jenny, 1980). With the return of rain and snow in the winter, swelling closes the cracks more rapidly in the upper horizons than farther down. This process produces churning of the soil mass called "swell turbation" (Jenny, 1980). A consequence of the swell turbation is the near-absence of plant litter on the surface of these soils. Common associates of these soils and the skullcap species are Cusick's sunflower (*Helianthus cusickii*) and low sagebrush (*Artemisia arbuscula*). Because of several distinctive components, this association of soils and plants has been labeled as the volcanic vertisol plant community. However, the plant community represents a distinctive subset of the low sagebrush and juniper woodland plant communities.

In the project study corridor, this species was observed at 11 separate sites along Segments K and L of the Proposed Project. Approximately 7,700 plants were observed in these populations. California Natural Diversity Database records indicate the presence of 11 previously recorded locations for the

species in the area southeast of Ravendale where the species was first collected (BioSystems, 1994b). Surveys for Tuscarora documented 13 populations with an estimated total of 22,000 plants. It is not clear whether some of these populations may have been counted more than once based on the available data. However, the information does indicate that this species is limited to a rather small area in Lassen County, California. Other known populations of unknown size have been documented from Washoe County, Nevada. It is likely that this species qualifies for consideration as a rare plant species under CEQA.

Holmgren's skullcap will be directly impacted by surface removal related to overland travel and structure placement on Segments K and L of the Proposed Project route. Impacts will be located immediately north of Angle Point JØ8 on Segment K and between Angle Points JØ8 and LØ1 on Segment L. No impacts are associated with any of the alternative alignments except for the East Secret Valley Alternative. Impacts to the species on the East Secret Valley Alternative will be quantified following completion of the spring rare plant surveys in late spring of 1995. Other potential impacts on Segments K and L will include potential for increased access, erosion and sedimentation, and introduction of non-native plants. Included under surface removal is the potential for soil compaction and other adverse changes to the volcanic vertisols where the species occurs. Mitigation for these impacts will be implemented as described in Mitigation Measures B-1, B-2, B-3, B-6, B-7, and B-8. Specific mitigation plans are required in the Community and Habitat Restoration Plan for the Proposed Project.

Full implementation of the proposed mitigation for this species will result in no net loss of habitat or populations of this species. Mitigation for impacts associated with the Tuscarora and Alturas projects will also reduce potential cumulative impacts to less than significant levels.

Green Prince's Plume (Stanleya viridiflora)

Green prince's plume has no State, Federal, or CNPS status. This species is a robust perennial herb and a member of the Mustard Family that grows from a stout taproot and is between 8 and 32 inches tall (Abrams, 1944). The root-crown is covered with old leaf bases (BioSystems, 1994b). Basal leaves are numerous and form a rosette. Stems are erect, sturdy, thick, and only minimally branched. Leaves are clustered at the base. Flowers are showy, with four narrow yellow petals and six stamens that greatly exceed the petals (BioSystems, 1994b).

This species occurs on white ash deposits in sagebrush scrub. Total vegetation cover of the white ash deposits is generally less than 5%. Green prince's plume is known in California from only about 12 populations. All of the known California populations are located in Secret Valley in Lassen County. Elsewhere the species is found in southeastern Oregon, southwest Montana, Wyoming, northern Utah, and northeast Nevada.

Two populations that support approximately 20 plants were documented in the study area of the Proposed Project on Segment L. The same two populations were documented by BioSystems for the Tuscarora Pipeline Project. One additional population has been documented on the East Secret Valley Alternative route. All of these populations are small and compact and will be avoided. Structure locations and overland travel routes will be placed outside of the known populations of this species. Indirect impacts may include increased erosion and sedimentation and potential introduction of non-native plants. Increased vehicle access will be unlikely on Segment L because the existing highway corridor and the Tuscarora Pipeline corridor will be used for overland access. Mitigation for possible indirect impacts will be implemented as described in Mitigation Measures B-7 and B-8. Specific mitigation plans are required in the Community and Habitat Restoration Plan for the Proposed Project.

The proposed mitigation measures will be coordinated with mitigation efforts implemented for the Tuscarora Pipeline Project since that project may cause additional direct impacts to the two populations. Full implementation of the proposed mitigation for this species will result in no net loss of habitat or populations of this species. Cumulative impacts will not occur if the proposed mitigation is fully implemented.

SPECIAL STATUS WILDLIFE

The discussion below includes the ecology of each wildlife species, its regulatory standing, population trends, if known, and the specific impacts and locations of impacts on the species as a result of the Proposed Project and alternatives. Species that will not be impacted or species whose habitat is not present in the study area are discussed at the end of this section.

Birds

American White Pelican (Pelecanus erythrorhynchos). The American white pelican, a California species of special concern, nests in California only within the Klamath Basin. The last breeding record within the vicinity of the Proposed Project was in 1986 at Honey Lake (Tait et al., 1978). However, sporadic use of the aquatic habitat in the vicinity of the Proposed Project occurs from April through September. White pelicans feed from the surface using their bills to scoop up food fish and crustaceans. These birds never roost in trees, preferring to rest on beaches and sandbars or old driftwood. They are known to use freshwater or saltwater habitats.

In the vicinity of the Proposed Project American white pelicans were observed foraging in the Pit River in the Warm Springs Valley. Pelicans nest regularly at the Clear Lake National Wildlife Refuge in the Klamath Basin; however, only sporadic nesting has occurred at Big Sage Reservoir northeast of Alturas. There are no known nesting records of this species in the project area.

Suitable foraging habitat for this species occurs in the Pit River Valley west of Alturas, at Honey Lake during years of heavy rainfall, and at Amedee Marsh on the extreme east edge of Honey Lake. The open water habitat preferred by this species will not be impacted by the Proposed Project. In locations where the transmission line occurs adjacent to potential habitat for this species, Mitigation Measure B-20 (bird flight diverters) will be applied to increase the visibility of transmission lines, including Segments A, B, C, and O. There will be no impact to this species with application of the mitigation measures described above.

Double-Crested Cormorant (Phalacrocorax auritus). The proposed transmission line route crosses the summer range of the double-crested cormorant, a California species of special concern. Double-crested cormorants breed in the vicinity of the project area at the Modoc National Wildlife Refuge from March through November when they migrate west to the coastal regions of California. Cormorants feed on fish and crustaceans, which they pursue underwater. Cormorants prefer water less than 9 meters deep with rocky or gravel bottoms. The cormorant population is extremely susceptible to pesticide contamination in water, and are thought to be declining as a result of human disturbance to habitat and increased gull predation on eggs and young.

These birds are commonly observed at the Modoc National Wildlife Refuge 2 miles east of the proposed route. They are also known to use the Pit River in the Warm Springs Valley area within the vicinity of the proposed route. Cormorants were also observed using the wetlands in the Madeline Plains.

The open water habitat preferred by the double crested cormorant will not be reduced as a result of the Proposed Project and therefore there will be no loss of habitat for this species. The local breeding habitat used by this species is located several miles east of the Proposed Project in the Modoc Refuge. During preconstruction surveys conducted as part of Mitigation Measure B-14, which applies to all species, if nests for this species are located they will be provided with a buffer zone and construction schedules will be established to avoid the area during the breeding season. Through application of Mitigation Measure B-14, impacts to this species as a result of the Proposed Project will be avoided.

Western Least Bittern (Ixobrychus exilis hesperis). Least bitterns are small (pigeon-sized), secretive, marsh-dwelling herons which often climb in reeds. This Federal Category 2 species prefers freshwater marshes but is known to use saltmarsh habitat occasionally where it may feed on crustaceans, insects, and amphibians or their larvae. Loss of wetland habitat in California has contributed to this species' population decline. Bitterns nest in the Modoc region wetlands, which provide cover and nesting habitat in the form of reeds (*Typha spp.*). Suitable habitat for this species occurs several miles east of the Proposed Project Segment C at the Modoc National Wildlife Refuge. Potential nesting habitat may also occur at the Amedee Marsh location and at the northern end of Long Valley Creek, where beaver dams and management techniques have resulted in increased wetland habitats. Most nesting habitat for this species will be spanned by the transmission line. Amedee Marsh is approximately 0.25 mile away from the Proposed Project corridor. In these locations Mitigation Measure B-20, bird flight diverters, will be

applied to increase visibility of the transmission line. With application of Mitigation Measure B-20 there will be no impacts to this species.

White-Faced Ibis (Plegadis chihi). White-faced ibises are wading birds with long, downcurved bills. The term "wading birds" refers to the fact that these birds forage by wading into wetlands. White-faced ibises, a Category 2 species, breed in the wetlands in the Modoc region and feed in the ricefields and wetlands located there. Ibises breed in the Modoc National Wildlife Refuge and in the adjacent wetlands. Their nests are floating nests constructed of reeds anchored to emergent vegetation. Ibises were observed in large numbers (> 100) in the Madeline Plains and at the Modoc National Wildlife Refuge. These large flocks were observed congregating on the edges and within alfalfa crops. However, even in this large flock the birds are very mobile. The ibis flocks observed in the Modoc region seemed to relocate on a daily basis.

This species has nested at Honey Lake as recently as 1980 and continues to nest in the Klamath Basin (Airola, 1980). However, it is not considered to breed regularly in California. It is present in the project area from March to September in the agricultural wetlands in the vicinity of Segments E, F, G, and H and is likely to occur at Amedee Marsh in Honey Lake Valley. This species' foraging habitat will be crossed in the Madeline Plains region where a number of alternative Segments occur. The proposed Segment E will not cross this species' habitat in the Madeline Plains. In the locations where this species is likely to forage bird flight diverters will be installed on the transmission lines (Mitigation Measure B-20), including the Madeline Plains proposed and alternative route Segments listed above. There will be no loss of foraging habitat for this species. With application of Mitigation Measure B-20 there will be no impacts to this species as a result of the Proposed Project.

Swainson's Hawk (Buteo swainsoni) Swainson's hawk is a California threatened species. Swainson's hawks occur mainly in the Central Valley and the northeastern portions of California. In the Central Valley region the population is concentrated in Yolo County agricultural regions, and typically nests are found in tall trees adjacent to croplands. However, in the vicinity of the Proposed Project, Swainson's hawks nest in juniper trees, which do not grow particularly tall, in sparsely vegetated flatlands (Bloom, 1980). These birds are residents in the project area during the breeding season and forage for small mammals in open habitats. Swainson's hawks were observed in the vicinity of the proposed route from Susanville north to Alturas, including several miles west of Segments M, N, O and Q, and in the vicinity of Segments J, K, L, I, F, G, A, B and C. The majority of the Swainson's hawk observations occurred in the agricultural lands south of Alturas, directly 2 miles east of Segment C. A Swainson's hawk's nest was identified near the proposed ROW in Secret Valley.

Foraging habitat for this species will be lost due to road-clearing and in locations of structure pads. This loss of habitat will be in small, discreet locations within broad ranging foraging territories. The combined total of habitat loss in the Segments listed above will be approximately 115 acres. Mitigation Measures B-1 and B-2 include measures to restore any habitat lost as a result of the Proposed Project.

Due to the nature of the Swainson's hawk's foraging techniques, which include soaring above open grasslands and preying upon small mammals, this species is not highly susceptible to collision with transmission lines. However, Mitigation Measure B-20, application of bird flight diverters to transmission lines, will be applied to areas identified as Swainson's hawk foraging habitat. Potential disturbance to nesting birds will be mitigated through application of Mitigation Measure B-14, which includes preconstruction surveys and monitoring to verify that construction buffers are maintained. With application of Mitigation Measures B-1, B-2, B-14, and B-20 impacts will be mitigated to less than significant levels.

Ferruginous Hawk (Buteo regalis). This California species of special concern is a winter resident at lower elevations and open grasslands and buttes in the Modoc Plateau and Honey Lake Valley regions. Ferruginous hawks frequent open grasslands, sagebrush, and fringes of juniper habitats where they prey on small mammals. The Proposed Project will occur on the extreme western edge of the nesting range for this species. A ferruginous hawk nest was identified during field surveys of the ROW north of the Infernal Caverns. This nest occurrence is the westernmost recorded nest for the species, although a nest was recorded by CDFG several years earlier in the vicinity of Termo, in the Madeline Plains (Hall, 1994).

Ferruginous hawks are winter residents that on rare occasion nest in the vicinity of the northern portion of the Proposed Project route. Foraging habitat, which includes grasslands, agricultural lands, and sagebrush, will be lost at structure locations and other areas of disturbance. Foraging habitat lost in Honey Lake Valley, the Madeline Plains, and in the Modoc Plateau will represent relatively small portions of the large foraging areas used by this species. Losses of foraging habitat will be mitigated according to Mitigation Measures B-1 and B-2, including restoration combined with offsite mitigation for the time required for restoration vegetation to become established.

Due to the nature of the ferruginous hawk's soaring, hovering, and perch hunting techniques, this species is not likely to collide with transmission lines. However, bird flight diverters will be installed in locations believed to be used by ferruginous hawks, including Segments C, E, M, O, and P. Buffer distances and construction timing to avoid impacting this species will be applied according to Mitigation Measure B-14, including 0.5-mile buffer distance. Preconstruction surveys will be performed to identify active nests and buffer zones will be designated and provided to construction managers. Biologists will monitor construction to verify that buffers are maintained. With application of the mitigation measures described above there will be no impacts to the ferruginous hawk as a result of the Proposed Project.

Golden Eagle (Aquila chrysaetos). The golden eagle is a California species of special concern. These birds of prey feed mainly on small mammals hunted in open habitats. Secluded cliffs with overhangs and large trees are used for cover and nesting. Old nests are revisited and alternative nest sites are maintained. In the vicinity of the Proposed Project golden eagles were widely observed in Honey Lake Valley, the Madeline Plains region, Secret Valley, and in agricultural areas south of Alturas. Golden

eagles were often observed perching on power poles adjacent to sagebrush scrub or agricultural areas. Golden eagles are year-round residents in the vicinity of the proposed transmission line from Honey Lake Valley north to Alturas. A number of nesting records document that the eagles are likely to nest anywhere along the route where suitable habitat occurs including the Amedee Mountains, which provide secluded cliff faces, and the rim rock area at the northern terminus of the proposed route. CDFG records indicate that golden eagles previously nested in the Rock Creek rim rock west of Alturas.

Due to the nature of the golden eagle hunting pattern which includes perching in open areas and soaring in the manner of most Buteos including red-tailed hawks, this species is not susceptible to collision impacts. However, Mitigation Measure B-20, designed to increase visibility of the transmission line, would be applied to Segments E, J, K, O, P, and Q where golden eagles are known to occur. The project design includes adequate distance between transmission lines to prevent electrocution, which can sometimes occur among birds with broad wingspans that allow contact with two live wires simultaneously. Loss of foraging habitat for this species may occur due to road clearing and substation construction. However, this loss will be slight and will occur in limited discreet locations within broad foraging areas used by this species. In addition, Mitigation Measures B-1 and B-2 will result in restoration and offsite compensation for habitat loss. Mitigation Measure B-16 will also apply to this species and preconstruction surveys will be conducted to establish locations and buffer zones and construction timing to protect any nesting golden eagles in the region during the construction year. There will be minor losses of foraging habitat for this species, which will be mitigated through restoration (Mitigation Measures B-1, and B-2). Other impacts to this species are not anticipated as a result of the Proposed Project.

Bald Eagle (Haliaeetus leucocephalus). This species is listed as a threatened species under the Federal Endangered Species Act of 1973, and under CESA. Bald eagles winter in the Warm Springs Valley, along the south fork of the Pit River (including Modoc National Wildlife Refuge), and in Honey Lake Valley along the Susan River. Required winter habitat includes a permanent water source nearby, such as a lake or river, with abundant perches. Wintering bald eagles roost communally in dense, sheltered, remote conifer stands, where available. At the Modoc National Wildlife Refuge the eagles have been observed using large, dense poplar and willow trees. The Klamath Basin, about 60 miles northwest of Alturas, supports about half of the continental United States west coast wintering population.

In the vicinity of the Proposed Project bald eagles winter use habitat is in discrete locations from Honey Lake north to Alturas. The eagles roost at the Modoc National Wildlife Area and along the Pit River in the Alturas region near the northern terminus of the proposed route. The Modoc National Wildlife Refuge is located approximately 3 miles east of the proposed transmission route Segment C and will not be crossed by the Proposed Project. Proposed route Segment A and alternative route Segment B will cross the Pit River Valley to the east of the preferred eagle roost areas identified in Warm Springs Valley near Canby which is located approximately 19 miles west of Alturas (BioSystems, 1994c). The Susan River and Amedee Marsh in Honey Lake Valley are used by wintering bald eagles in the Honey Lake

Valley. (Amedee Marsh is created by runoff from the Amedee Geothermal Project located on the east shore of Honey Lake.) The Proposed Project will occur several miles east of the Susan River and approximately 0.25 mile east of Amadee Marsh. These foraging and roosting areas will not be crossed by the Proposed Project. There will be no loss of bald eagle foraging habitat in the locations described above.

Bald eagles are not prone to collision with transmission lines since they hunt from the air or from an exposed perch (see Appendix E.2). However, flight diverters (Mitigation Measure B-20) will be applied to the Pit River Valley location and the east Honey Lake locations of the proposed transmission line where bald eagles are known to occur and may use the river corridor as a pathway to reach foraging areas on the Modoc Refuge. Project design includes establishing a minimum distance between transmission line wires which exceeds the wingspan of this species, approximately 7 feet, which removes the potential for bird electrocution which may occur when two live wires are contacted simultaneously. There will be no loss of foraging habitat for this species and no impacts to this species are anticipated as a result of the Proposed Project.

Northern Harrier (Circus cyaneus). This ground-nesting raptor, formerly known as the marsh hawk, is a California species of special concern. Harriers feed on small mammals, reptiles, and crustaceans and use tall grasses in wetland habitats or the edges of agricultural fields for nesting cover. Nests are usually near wetlands but open fields or grain fields where prey items are present are also used. One of the primary reasons given for this species' decline has been the harvesting activities of farmers, including hay mowing, in fields where harriers build their nests on the ground. Such human disturbance has had detrimental effects upon the breeding success of this species in the Central Valley portion of the State. Within the project area this species has been widely observed throughout the California portion of the proposed route, including Upper Long Valley, Honey Lake Valley, the Madeline Plains, the Pit River Valley, and the agricultural regions south of Alturas. In the project area northern harriers are one of the most common birds of prey observed. However, there were no observations of northern harriers nesting in the ROW.

Harriers are year-round residents in the project area where they feed in pastures, wetlands, and agricultural fields. They prey upon small mammals, passerines, and small waterfowl species. They have been observed foraging in sagebrush and bitter brush areas in Secret Valley. Harriers forage at low altitudes and were often recorded foraging less than 25 feet from the ground. Due to this low-flying foraging technique this species is not prone to transmission line collisions.

During preconstruction surveys (see Mitigation Measure B-14), any northern harrier nests identified in the Proposed Project area, including adjacent to access roads, will be located. Buffer distances will be established and maintained through establishment of biological monitoring during construction.

Prairie Falcon (Falco mexicanus). Prairie falcons, a Federal Category 2 species, are year-round residents in the Proposed Project area. They are commonly observed in the agricultural portions and sagebrush habitats in the project area. The status of the population in the Great Basin is poorly known (Remsen, 1978). Prairie falcons have been observed along Segments A, C, H, I, K, and L, and in the agricultural area south of Alturas. Since this species may be prone to collisions with transmission lines, Mitigation Measure B-20, bird flight diverters, will be applied to these Segments to increase visibility of the lines.

American Peregrine Falcon (Falco peregrinus anatum). The Peregrine falcon is a State and Federal endangered species. Peregrines occur worldwide especially in woodland, forest, and coastal habitats. Their decline, documented since the 1940s, has been attributed to eggshell thinning as a result of pesticide and PCB contamination. However, the population is believed to be recovering well in California. These birds usually breed and feed near water in association with cliffs and canyons used for cover and nesting. They are fast, agile flyers and prey upon other birds, especially waterfowl, caught on the wing. Peregrine falcons are seasonal residents during the breeding season and may occur in the vicinity of the proposed transmission line route where suitable habitat occurs, including the Rock Creek rim rock area 4 miles west of Alturas near the northern terminus of the proposed route. A nest was observed during field surveys approximately east of the proposed transmission line Segment O. It is likely that these birds feed upon waterfowl in the Honey Lake Valley area.

The proposed transmission line will not conflict with falcon flight at their feeding area. However, Mitigation Measure B-20, installation of bird flight diverters or aviation marker balls, will be applied along Segment O of the proposed transmission line to increase visibility of the lines. There will be no loss of foraging habitat for the peregrine falcon and there will be no impacts to this species as a result of the Proposed Project.

Sage Grouse (Centrocercus urophasianus). This gamebird has been listed as a Federal Category 2 and a California species of special concern. It was formerly an abundant resident in northeast California, but is now considered an uncommon species (Remson, 1978). Population threats include overgrazing by cattle, which reduces the cover available to these ground-nesting birds. Lassen and Modoc counties have the most stable populations of sage grouse in the State (CDFG, 1984). Grouse are well known for their courtship behavior, which includes gathering at specific locations known as "leks" during the early spring. Males arrive at the lek location and display their breeding plummage during a courtship strutting period. Leks are commonly located in rocky, grassy open areas surrounded by moderate to dense sagebrush. During field surveys male grouse were observed in early spring strutting in lek locations that contained pools of standing water as a result of recent snowmelt.

Sage grouse habitat is distributed throughout the Proposed Project area from Termo north to Sage Hen Summit, and from Crooks Canyon north to Alturas. However, there are interruptions in the habitat which may include agricultural development, dense stands of junipers, or broad open grasslands and the

habitat is not continuous in these regions. Portions of Segments K, I, J, H, and C include sage grouse habitat and or leks. A previously unknown lek location was recorded within Segment J, and leks identified during surveys for Tuscarora pipeline and those included in CDFG records were mapped. Leks located within 4 miles of the ROW were identified and mapped, and sage grouse brood habitat was mapped using brood habitat descriptions based on descriptions provided by Call and Maser (1985).

The total amount of brood habitat lost to disturbance or to structure construction, staging areas, and road clearing will be approximately 5 acres. In the Segments listed above a total of 27 acres of habitat disturbance or loss will be incurred. Mitigation Measures B-1 and B-2 will be applied to all areas of habitat loss or disturbance in these areas. Sage grouse lek locations will be protected by a 50-foot buffer verified by biological monitors present during construction (Mitigation Measure B-14). Structures constructed as part of the Proposed Project will create additional perches for birds of prey that may feed on the sage grouse. Mitigation Measure B-22 will involve installation of perch guards, special design hardware items placed on horizontal members of strutures to deter roosting or perching. This measure will be applied along the length of Segments K, I, H, J, and C to reduce potential impacts on sage grouse by birds of prey.

With application of the mitigation described above, there will be no impacts to this species as a result of the Proposed Project.

Mountain Quail (Oreortyx pictus). This harvest species is listed as Federal Category 2 by the USFWS. Mountain quail are found seasonally in open brushy montane regions and in conifer forests. The critical habitat element for this species is available water. It is thought that the species decline is a result of increased predation at water sources. Heavy grazing by cattle also reduces habitat and cover for quail and leaves them susceptible to predators. Quails nest on the ground, often at the base of a stump or tree. Broods are raised in the vicinity of a water source. Dew and vegetation provide water for quail; however, in dry habitat these birds require a permanent water source. Suitable habitat for this species occurs in the Warner Mountains 20 miles east of the project area. Suitable habitat for this species does not occur in the project area.

Greater Sandhill Crane (Grus canadensis tabida). Adult greater sandhill cranes stand approximately 4 feet tall and have wingspans of up to 6 feet. The nearest North American relative to the greater sandhill crane is the endangered whooping crane *Grus americana* which occurs in the Great Plains region. Of the five populations of greater sandhill cranes currently recognized, the Central Valley population (CV population) is the only one know to be declining in portions of its breeding range. An estimated 3200 individuals make up the CV population which winters in the San Joaquin Valley and breeds from northeast California to south/central and east Oregon. In the vicinity of the Proposed Project, Modoc and Siskiyou counties have shown population increases, while minor declines have been noted in the southern portion of the range (Littlefield, 1989). This species has been listed as threatened by the California Fish and Game Commission since 1983 (Littlefield,1989).

Powerline collisions appear to be the most significant source of crane mortality among the CV population (Pogson,1988). Poor visibility of powerlines due to inclement weather, distance of powerlines from flight take-off and landing areas, and wind conditions which make it difficult for cranes to avoid wires are factors which contribute to crane collisions (Morkill,1991).

The following description of greater sandhill crane habitat use in the Proposed Project area, daily flight patterns, and subsequent estimates of crane collision potential are based on information available in the scientific literature, consultation with experts, and direct observations.

Crane Habitat Use in the Proposed Project Area. The daily activity pattern for cranes in the Proposed Project area includes approximately 4 short daily flights:

1) Pre-dawn flight from roosting area to foraging area
2) Mid-day flight from foraging area to roost
3) Afternoon flight from roost to foraging area
4) And a final flight at dusk to return to roost for the night.

Research has shown that cranes are at higher risk of collision with transmission lines during their short daily flights (Morkill 1991). This is believed to be due to the low flight altitude cranes prefer during short flights. During migration cranes fly at altitudes well above the 70-130' overhead transmission line height for the Proposed Project.

Greater sandhill cranes are present in the Proposed Project area from late February through October. The cranes use wet meadow habitat and agricultural areas from Alturas south to the Madeline Plains. The largest concentrations of greater sandhill cranes occur at the Modoc National Wildlife Refuge (Modoc Refuge), southeast of Alturas, where 3500 acres of land are managed specifically for use by greater sandhill cranes and waterfowl (Ryno, 1994). They also nest in Likely Valley (south of the Modoc Refuge) and on Honey Lake Wildlife Area.

Adult cranes generally arrive in the Modoc Plateau region in late February and begin to establish nest territories, followed by the subadult cranes which begin to arrive from the Central Valley wintering grounds in late March. Through the breeding season adult pairs will remain on nest territories until the hatching year birds are able to fly, sometime in August (Ryno, 1995). Subadult birds generally roost at the Refuge; however these non-breeding birds are not loyal to a single territory and will fly to suitable foraging habitat in various locations throughout the region. Sometime in August when the hatching year cranes are able to fly, the adult pair and their fledgling will begin flying to foraging areas some distance from the nest, returning to the nest territory to roost. In late September and early October the subadults and breeding pairs with young will gather at the Modoc Refuge in staging areas prior to the migratory flight to the wintering grounds in the Central Valley. Staging areas in the vicinity of the Proposed Project include the Modoc Refuge where flocks of 300 cranes are known to stage, and the Madeline Plains where smaller flocks of up to 50 birds have been known to stage (Ryno, 1994).

Crane Use Areas. Direct observation, literature survey, and consultation with Modoc Refuge staff and other crane experts were used to determine crane use areas. Suitable crane habitat outside the Modoc Refuge boundaries and within the vicinity of the Proposed Project occurs in the following locations:

- The Pit River Valley - West of Alturas, this area supports breeding and non-breeding cranes. The valley is also used by cranes flying from the Alturas area through to the Warm Springs Valley several miles west. Based upon direct observations and management agency observations, approximately 3 pairs of breeding cranes and 6 non-breeding cranes may use the wet meadows and hay fields in the area. The crossing of the Pit River Valley by the Proposed Project would bisect between 3 (proposed route) and 5 (alternative route) miles of crane habitat.

- The Madeline Plains - This region is just south of Likely Mountain and includes open grasslands, wet meadows, sage brush, and agricultural habitat. As many as 2 nesting pairs of cranes have been reported using the Madeline Plains, and flocks of approximately 50 cranes may use this area during staging and migration (Littlefield, 1989). In the Madeline Plains between 10 (proposed routes) and (up to) 20 (alternative routes) miles of the proposed transmission line would cross crane habitat.

Crane Collisions. Crane collisions with powerlines are documented in several sources in the scientific literature. Local collision data was also collected from the Modoc Refuge. In order to estimate the potential for greater sandhill crane collisions, calculations were made based on both local data and the literature data.

Data available in the literature includes documentation of the total number of crane flights over transmission lines and the total number of collisions associated with these lines (Morkill, 1991). Local data available from the Modoc Refuge includes documentation of crane mortalities associated with transmission lines on the refuge. In the following section these two data sets are analyzed and the estimates of mortality are compared.

Estimate of Collisions Based on Literature Data. During two years of research along the Platte River in south-central Nebraska, 25 crane collisions were recorded from a total of 179,850 crane flights over 345 Kv transmission lines (Morkill, 1991). This research documented greater sandhill crane collisions with 88.5′ tall 345Kv lines with structures similar to those associated with the Proposed Project. A collision rate of .00014 is calculated from $25 \div 179{,}850 = .000139$, rounded up to .00014.

Using these data, the total number of crane mortalities can be seen as the product of crane overflights and the calculated collision rate. In order to apply the collision rate calculated from literature values to the Proposed Project area, crane overflights must first be estimated. Crane overflights must consider factors such as bird use days and number of flights per day by individual birds.

The equation used to determine potential crane collisions in the project area, therefore, takes into account the length of time when cranes are present in the project area, the local flight behavior of cranes, and the number of cranes likely to be present in areas adjacent to the Proposed Project. The equation is

described below followed by a discussion of the data sources used to determine the variables in the equation.

$$D \times F \times B \times Rc = Ca$$

(D = Number of days per year when cranes are present in the project area)
(F = Average number of short flights per day between roosting and foraging area)
(B = Number of birds present in a given use area)
(Rc = Collision rate)
(Ca = Total number of crane collision mortalities estimated to occur on an annual basis)

Data obtained from the Modoc National Wildlife Refuge and direct observations of crane behavior were used to establish the number of days when cranes might be present in the two crane use areas identified above (the Pit River Valley and the Madeline Plains).

Direct observations of crane behavior and habitat use in the vicinity of the Proposed Project, consultation with the CDFG and U.S. Fish and Wildlife Service, and consultation with crane experts familiar with local crane use patterns were used to confirm that cranes generally make four daily flights between foraging areas and roost areas each day.

Historical nesting records, direct observation, and knowledge of local experts were used to estimate the number of cranes likely to be present in the crane use areas.

The table below lists the estimated number of crane mortalities which would occur on a yearly basis as a result of the Proposed Project in each crane use area in the vicinity of the Proposed Project. Seasonal use of habitats and behavior of local cranes is taken into account by assessing the number of days present and birds present in each crane use area.

Table E-4 Estimated Crane Mortalitites Yearly Basis - Proposed Project

Location	Days Present	Flights Per Day	Birds Present	Collision Rate	Total Mortalities Per Year
Pit River Valley (Breeding birds)	50	4	9	.00014	.25
Madeline Plains (Breeding birds)	50	4	9	.00014	.17
Pit River Valley (Non-breeding)	210	4	6	.00014	.71
Madeline Plains (staging/migration)	21	4	50	.00014	.59
TOTAL COLLISIONS (yearly basis)					1.72

The total number of crane collisions estimated to occur on a yearly basis as a result of the Proposed Project is 1.72.

Estimate of Collisions Based on Modoc National Wildlife Refuge Data. A total of 8 crane collisions with electric power distribution lines were recorded at the Modoc Refuge during the 7.5 year period prior to

the application of aviation marker balls which were installed in 1986 to increase visibility of the distribution lines. Approximately 7.65 kilometers of distribution lines are present at Modoc Refuge. These data show that approximately .1364 collisions per kilometer per year occurred at the Refuge (8 collisions ÷ 7.5 years ÷ 7.65 kilometers of line = .1364 collisions per kilometer per year.

A total of 13.2 kilometers of transmission line in the project vicinity would cross crane use areas if the Proposed Project were constructed (see tables below.) Applying the local collision data (.1364 collisions per kilometer per year) to the Proposed Project, yields an estimated 1.8 collisions per year (13.2 kilometers x .1364 collisions per kilometer per year = 1.8). This estimate (1.8 mortalities per year) compares well with the 1.72 mortalities per year calculated by application of the collision rate derived from literature sources.

Table E-5 Length of Line Crossing Crane Use Area- Proposed Project

USGS Quad Sheet/Proposed Segment	Kilometers	Habitat Type
Mahogany Ridge/Proposed Segment A	1.3	Upland habitat between use areas
Alturas/Proposed Segment A	2.5	High quality wet meadows
Mc Donald Peak/Proposed Segment E	8.8	Uplands between use areas
Madeline/Proposed Segment E	1.6	Uplands between use areas

Mitigation for Potential Crane Collisions. Mitigation for crane collisions with the proposed transmission line shall include marking transmission lines to increase the visibility of the lines. Hanging aviation marker balls on transmission lines has been shown to be effective in reducing crane collisions (Morkill, 1991). However, marker balls catch wind and create vibration in the transmission lines. In addition, raptors occasionally get their talons stuck in the styrofoam material (Colson, 1994). Recently, spiral vibration dampers have been successfully used to increase visibility of transmission lines (Brown, 1993). The vibration dampers are lightweight, highly visible, do not catch wind, and do not pose a threat to raptor species. Therefore, mitigation for potential crane collision with the proposed transmission line will include hanging vibration dampers in locations where the transmission line crosses crane habitat.

Residual Impact - Spiral vibration dampers (Mitigation Measure B-20) have been shown to effectively reduce the potential for crane collisions with transmission lines. However, the potential for crane collision would not be completely removed even with application of the mitigation measure. At the Platte River Study area, unmarked transmission lines resulted in a collision rate of .00014. With marked lines the collision rate in the same location was reduced to .000061. A "marking factor" of .44 was determined based on the ratio of collision rates with marked and unmarked lines (.000061 ÷ .00014 = .44).

The number of crane collisions without marking the transmission lines is estimated at 1.72 collisions per year as calculated from the literature collision rate. However, when application of the spiral vibration

dampers as a mitigation measure is considered, the "marking factor" must be applied to the total of 1.72. This results in a reduction of collisions, i.e., 1.72 x .44 = .76 collisions per year.

Similarly, the "marking factor" of .44 can be applied to the estimate of 1.8 collisions per year calculated from local data. This application results in an estimate of .79 collisions per year. Rounding the estimates of .76 and .79 to the nearest tenth results in an estimate of .8 collisions per year after marking of transmission lines.

Mitigation for Residual Impact - Additional mitigation (Mitigation Measure B-21) is required to off-set the potential loss of .8 individuals per year. This potential loss will be mitigated through acquisition and management of suitable nesting habitat. Increased nesting habitat available to the cranes, will result in increased production of young. The following section summarizes the process used to determine the total amount of suitable nesting habitat which must be acquired to mitigate this potential loss.

Average annual nest success (i.e., fledglings produced per nesting pair) among greater sandhill cranes in managed habitat at the Modoc National Wildlife Refuge is approximately .4 birds per nest (Ryno, 1995). The average annual nest success on private lands not managed for crane use is approximately .17 (Littlefield, 1995). A typical greater sandhill crane nest territory size is about 100 acres (Ryno, 1995; Schlorff, 1995; Littlefield, 1995).

In order to compensate for a loss of .8 birds per year, suitable nesting habitat must be acquired and managed for crane use and production must be increased to the rate of nest success recorded on managed lands. Therefore, nest success must be increased by .23 birds per territory due to acquisition and management of suitable nesting habitat. The ratio of current nest success (.4) to the necessary increase in nest success (.23) is 1.74. This is referred to as yield in the compensation equation given below.

The following equation was used to calculate the total number of acres required to create an increase in nest production equivalent to the estimated yearly loss of cranes:

$$Cm\ [.8]\ /\ Pr\ [.4]\ x\ Ts\ [100\ acres]\ x\ Yield\ [1.74]\ =\ Ra\ [348\ acres]$$

(Cm = Estimated yearly collision loss of sandhill cranes due to the Proposed Project, mitigated: .8 birds/year)
(Pr = Production rate of nesting territories on managed lands: .4 fledgelings/territory)
(Ts = Average nest territory size: 100 acres)
(Yield = Ratio of desired nest success over necessary increase in nest success: .4/.23)
(Ac = Required acreage for compensation)

Approximately 348 acres of land must be acquired to increase total greater sandhill crane nest production to off-set potential losses due to collisions with the proposed transmission line.

Land acquired to satisfy this mitigation measure will be suitable nesting habitat for greater sandhill cranes. The CDFG must verify that the land is suitable nest habitat prior to the acquisition. This verification shall include a site visit and habitat evaluation. Water rights or access to water supply to the parcel chosen must also be acquired to provide for management of the habitat during the crane breeding period. Ownership and management of the land shall be given to the appropriate resource agency (i.e., USFWS, CDFG, BLM), as described in Section C.3.2 of the EIR/s.

Effectiveness of Mitigation - A five year crane monitoring program shall be established within the Mitigation Monitoring Program for the Proposed Project. Monitoring shall be established to evaluate the effectiveness of the line marking mitigation (and the line's overall effect on crane mortality to verify that higher rates than estimated herein are not realized), and to monitor crane production on the off-site parcel. Survey protocol, including reporting frequency for the monitoring program shall be subject to approval by the CDFG.

Long-Billed Curlew (Numenius americanus). The long-billed curlew, a California species of special concern, breeds in the wetland areas of the Modoc region on grazed, mixed grass and short grass prairies, or in wet meadows. Open croplands are used for foraging during the winter months. However, curlews migrate to lower elevations and coastal areas during this period. Eastern U.S. populations have declined significantly as a result of agricultural practices and this population has been proposed for Federal listing as endangered. Western populations, though reduced, seem to be stable. Long-billed curlews were observed in the Madeline Plains agricultural areas and in the Pit River area in Warm Springs Valley. In addition, curlews were observed in the Modoc National Wildlife Refuge where they are known to nest. In general, the wetlands and pastures in the vicinity of the Proposed Project provide an excellent breeding habitat for this species.

Wetland habitats used by this species during the breeding season will not be impacted by the Proposed Project (see Project Description, Part B). Therefore there will be no impacts on this species as a result of the Proposed Project. However, in locations such as Honey Lake Valley and Duck Lake, where shorebirds may occur during heavy rain years or during migration Mitigation Measure B-20, application of bird flight diverters, will be applied to increase visibility of tranmission lines. This mitigation measure will reduce potential impacts to shorebirds such as the long-billed curlew to a less than significant level.

Black Tern (Chlidonias niger). Black terns, a Federal Category 2 species, breed in the wetlands in the Modoc Plateau region. Terns nest in wetlands either in floating nests or on the ground with plant matter used for lining. They feed on insects, crayfish, tadpoles, and small mollusks found in emergent wetlands. Black tern populations have decreased in California due to loss of habitat. This has been mitigated to some degree thorough increased rice farming. Black terns were observed in the vicinity of the Modoc National Wildlife Refuge, 3 miles east of Segment C (Biosystems, 1994b).

Suitable nesting habitat does not occur for this species in the project area; therefore, there are no impacts anticipated to this species as a result of the Proposed Project. However, in locations such as Honey Lake Valley and Duck Lake, where shorebirds may occur during heavy rain years or during migration, Mitigation Measure B-20, application of bird flight diverters, will be applied to increase visibility of tranmission lines. This mitigation measure will reduce potential impacts to shorebirds such as the black tern to a less than significant level.

Burrowing Owl (Athene cunicularia). Burrowing owls are a California species of special concern. They are year-round residents of open dry habitats. Burrowing owls use rodent burrows for nesting cover. Adults will perch near the nest burrow during the morning and evening hours and take cover in the nest during the hottest part of the day. These owls prey on insects, small mammals, reptiles, and carrion. Burrowing owls are known to successfully nest in, and adjacent to, developed areas, including college campuses and airports. However, burrowing owls rely upon rodent burrows and suitable foraging habitats, and many human activities including poisoning and trapping rodents, discing, and paving land have reduced habitat for this species and contributed to its population decline. Burrowing owls were observed nesting along the proposed transmission line route in Honey Lake Valley along Segment O just east of the Sierra Army Depot. An adult bird was seen perched near burrows; however, there were no young birds observed.

This species forages in open grasslands and scrub habitats. There will be incremental losses of this habitat due to structure construction in the vicinity of Segments O, P, and Q where suitable habitat occurs. The combined total of habitat lost in the Segments listed above will be approximately 13 acres. This loss will be mitigated according to Mitigation Measures B-1 and B-2 as described above and may include offsite mitigation to address habitat, which will be unavailable during the time required for revegetation plants to become established. Burrowing owls are not likely to collide with transmission lines due to their low flight during foraging. However, in locations that include suitable foraging habitat for this species Mitigation Measure B-20, bird flight diverters, will be applied. With application of the mitigation measures described above there will be no impacts to the burrowing owl as a result of the Proposed Project.

Great Gray Owl (Strix nebulosa). Great gray owls, the largest North American Owl, are listed as a California endangered species. In the vicinity of the Proposed Project, these owls are found in the Warner Mountains located approximately 20 miles east of the project area. During the summer months, great gray owls nest in conifer forests and feed on small mammals in wet meadow habitat. Studies indicate that there may be fewer than 50 pairs of great gray owls remaining in California, making this the rarest owl in the State. Suitable habitat for this owl species does not occur in the project area. Therefore, there will be no impacts to this species.

Long-Eared Owl (Asio otus). This species is a year-round resident of northeastern California and is a California species of special concern. The long-eared owl prefers to use riparian habitats, including oak

thickets and other dense stands of trees. Like most owl species, the long-eared owl does not build its own nest; it uses nests built by raptors or magpies, or former squirrel nests. One long-eared owl nest was observed approximately 0.5 mile from Segment O on the northeast side of the Fort Sage Mountains during 1994 field surveys. The nest was occupied and one young bird was observed. Remsen (1978) reports that in 1978 long-eared owls were still fairly common in willow thickets along the Susan River north of Honey Lake. Suitable habitat for this species is not present in the project area and therefore this species will not be impacted by the Proposed Project.

Willow Flycatcher (Empidonax traillii). This flycatcher species is a California threatened species that nests in dense willow riparian habitats. The decline in California willow flycatcher populations has been attributed to habitat loss. This flycatcher is a member of the Empidonax family of flycatchers and is extremely difficult to identify in the field. The song of this species is usually used as the identifying characteristic since the birds species in this family resemble one another very closely.

As riparian habitat is lost to development, agriculture, and cattle grazing, breeding habitat for these birds is reduced to isolated regions. Within the Modoc National Wildlife Refuge and the Long Valley Creek portion of the Doyle Wildlife Area the riparian habitat has begun to regenerate. Although there were no observations of willow flycatchers in the vicinity of the proposed route, small amounts of suitable habitat are present and increasing. With application of Mitigation Measure B-14, including preconstruction surveys and biological monitors to be present at construction, there will be no impacts to this species.

Bank Swallow (Riparia riparia). This California threatened bird species has very specific habitat requirements and nests only in cutbanks of rivers. Bank swallows nest in colonies and were formerly common on major rivers in the State. Habitat loss due to development, flood control projects which incorporate concrete or riprap banks, and other disturbances have led to the population decline of the bank swallow (CDFG, 1992). The Pit River and Long Valley Creek provide excellent habitat for this species in the vicinity of the Proposed Project. Bank swallows were not observed during 1994 field surveys; however, the excellent habitat present in the area represents potential critical habitat for this species. Through application of Mitigation Measure B-14, which applies to all species, any nests located during preconstruction surveys will be protected with buffer zones, construction timing, and biological monitoring, so there will be no impacts to this species as a result of the Proposed Project.

Loggerhead Shrike (Lanis ludovicianus). This Federal Category 2 species has a characteristic behavior of impaling its captured prey upon barbed wire or thorns. This behavior has earned shrikes the nickname "butcher birds." Shrikes occur throughout California in dry grassland habitats and open sage and scrub habitats. They nest in shrubs or isolated trees in stick nests constructed by both male and female breeding birds. Shrikes were commonly observed in the Basin and Range habitats and in the open sagebrush habitats in the Modoc region. One nest was located in the proposed route ROW in Segment O in Honey Lake Valley. This passerine will not be impacted by the Proposed Project since Mitigation Measure B-

14, will provide for location and establishment of buffers for nests which are located in or along the ROW.

Yellow Warbler (Dendroica petechia brewsteri). This small yellow songbird is a California species of special concern. Warblers as a group are known for the melodious songs the males sing during the breeding season. Breeding occurs in riparian woodland habitat in coastal California to the Sierras and the northeast part of California. Brood parasitism by brown-headed cowbirds and increased predation are believed to have caused the yellow warbler population to decline. Riparian habitat in the Basin and Range as well as the Modoc region includes potential breeding habitat for this species, particularly in the riparian habitat within the Modoc National Wildlife Refuge and the Doyle Wildlife Area in Long Valley. Through application of Mitigation Measure B-14, which applies to all species, any nests located during preconstruction surveys will be protected with buffer zones, construction timing, and biological monitoring, therefore, there will be no impacts to this species as a result of the Proposed Project.

Tricolored Blackbird (Agelaius tricolor). Tricolored blackbirds are a California species of special concern and are a Federal Category 2 species. These birds nest in large colonies in wetland vegetation, grain crops, or brambles. Loss of wetland habitats and open grassland habitats to development have led to this species' decline (CDFG, 1990). Tricolored blackbirds are known to nest in the Modoc region; however, there were no observations of this species during the 1994 surveys. With application of Mitigation Measure B-14, including preconstruction surveys and biological monitors to be present at construction, there will be no impacts to this species.

Mammals

Townsend's Western Big-Eared Bat (Plecotus townsendii townsendii)

Species-specific bat surveys were conducted by Dr. Denny Constantine during August 1994. Dr. Constantine has obtained the Memorandum of Understanding required by the CDFG to survey for special status bat species. Surveys were focused in suitable habitat identified during flights over the Proposed Project area. Methods included mist-netting, specialized electronic frequency receivers used to identify bat sonar frequencies, and ground surveys of suitable habitat.

The big-eared bat is a Federal Category 2 species and a California species of special concern. Big-eared bats are known to occur throughout California in grasslands and deserts as well as high-elevation forests where they use man-made structures, lava tubes, and limestone caves for roosting. Availability of potential roosting areas seems to be the limiting habitat requirement. However, little is known about this species' distribution in the Modoc or Basin and Range regions. These bats are known to nest in colonies with females collected in one cave or abandoned building with young. Males are thought to roost alone in crevices in rocks or under bridges or in other man-made structures. Big-eared bats feed on insects

caught on the wing. Like most bat species, the big-eared bat uses sonar to navigate during feeding, which occurs at dusk and early evening.

During field surveys a colony of Townsend's western big-eared bats was identified at the Infernal Caverns approximately 1 mile east of Proposed Segment C. This species' roosting habitat will not be crossed by the Proposed Project. Therefore impacts to this species are not anticipated.

Spotted Bat (Euderma maculatum). This Federal Category 2 bat species is not currently believed to occur in the northeast portion of California. Spotted bats are considered to be one of North America's rarest mammals (CDFG, 1990). They are known to occupy caves, cliffs, and rock crevices in arid landscapes to coniferous forests in southern California. These bats are believed to be solitary and thought to prey primarily upon moths. Due to the solitary nature of this species and its preferred habitat, this species is extremely difficult to find. Field surveys, including mist-netting and the use of electronic surveillance equipment, did not result in the identification of the spotted bat in the project area. Therefore, this species is not expected to be impacted by the Proposed Project.

Mastiff Bat (Eumops perotis californicus). This species is the largest native bat in the United States . Mastiff bats are a California species of special concern and are thought to reside at low elevations in coastal basins in southern California. Roosts are usually in large cracks in granite or sandstone or in hollow trees within open habitats. Their numbers are believed to be reduced as a result of development and loss of habitat. Distribution maps for this species do not indicate occurence in the Modoc or Basin and Range regions (CDFG, 1990). However, this species may be present in suitable habitat in the Modoc or Basin and Range regions (Pierson, 1994). Field surveys, including mist-netting and the use of electronic surveillance equipment, did not result in the identification of the spotted bat in the project area. Therefore, this species is not expected to be impacted by the Proposed Project.

Pallid Bat (Antrozous pallidus). The pallid bat occurs throughout California in lower elevations except for the high Sierra and the northwestern part of the State. Pallid bats roost in groups of 20 or more in caves or mineshafts, which provide cover and protection from high temperatures. Maternity colonies can include more than 100 individuals. Pallid bats have a stout skull and dentition such that they take hard-shelled insects like beetles, Jerusalem crickets, and scorpions for prey. Pallid bats are large and slow-flying, and most often forage on the ground (CDFG, 1990). Field surveys, including mist-netting and the use of electronic surveillance equipment, did not result in the identification of the spotted bat in the project area. Therefore, this species is not expected to be impacted by the Proposed Project.

Pygmy Rabbit (Brachylagus idahoensis). This Federal Category 2 species and California species of special concern is also considered a harvest species (CDFG, 1990). The pygmy rabbit is uncommon and found only in the sagebrush and pinyon juniper habitat in the Basin and Range and Modoc regions in California, Nevada, Oregon, Idaho, and Utah. This species is believed to avoid heavily grazed areas and

is usually associated with big sage brush habitat. Populations are thought to be distributed in patches (CDFG, 1990). Pygmy rabbit habitat occurs in the vicinity of Segments L, O, P, and Q.

During preconstruction surveys conducted as part of Mitigation Measure B-14 pygmy rabbit habitat will be mapped. Disturbance to this habitat will be avoided during construction and operation of the Proposed Project. To reduce increased pressure on this small mammal population, which may occur due to increased perching opportunities, Mitigation Measure B-22 will be applied. This will involve installation of perch guards on horizontal members of the structures along Segments L, O, P and Q to discourage birds of prey from perch-hunting and increasing pressure on this species. With application of Mitigation Measures B-14 and B-22, no impacts on this species will occur.

California Bighorn Sheep (Ovis canadensis californiana). In northeastern California bighorn sheep were introduced into the Warner Mountains Wilderness after 1979 (CDFG, 1990). This species prefers open areas with low-growing vegetation for feeding, with close proximity to steep, rugged terrain for escape and lambing. This species is extremely sensitive to disease, and the Warner Mountains population experienced a total die-off in winter 1987-88. Bighorn sheep do not occur in the project area.

Fish

In the project area, the Pit River, Stones Canyon, Cherry Creek, Dry Creek, Secret Creek, Crooks Canyon, Long Valley Creek, Dry Valley, and Red Rock Canyon support channels, bed and bank, and permanent water supply. The Proposed project design includes spanning all creek crossings.

During field surveys conducted for the Tuscarora Pipeline Project fisheries surveys were conducted in Pit River, Dry Creek, Cherry Creek, and Secret Creek. Special status species with potential to occur in the region include:

- Short-nosed Sucker (*Chasmistes brevirostris*)
- Lost River Sucker (*Deltistes luxatus*)
- Modoc Sucker (*Catostomus microps*)
- Pit Roach (*Lavinia symmetricus mitrulus*)
- Hardhead (*Mylopharodon conocephalus*)

Surveys of the Pit River revealed green sunfish, tui chub, bluegill, Sacramento squaw fish, and brown bullhead. There were no fish present during surveys of Cherry Creek. Special status fish species found in the project area include the Pit roach, a Category 2 species and California species of special concern, and the hardhead, a California species of special concern. These special status fish were observed in ditches near the South Fork Pit River near Likely and near Rattlesnake butte in the Pit River (Tuscarora, 1994b).

Mitigation Measure B-15 stipulates that construction activities will not be permitted within the buffer zone established along each riparian area in the vicinity of the Proposed Project. In addition, the use of concrete will not be permitted and activities such as rinsing equipment, parking, or discharging wastewater to streams will be prohibited as part of the construction specifications. These measures will be applied to protect water quality in the aquatic systems in the project area. Buffer distances will be established using the current USFS standard in consultation with BLM, CDFG, and USFWS. Because streams will be spanned and no construction activities would be allowed in riparian buffer zones, no special status fish species will be impacted.

Reptiles

Northwestern Pond Turtle (Clemmys marmorata marmorata)

The western pond turtle is a Federal Category 2 species and a California species of special concern. This reptile was once common in California. Habitat loss and hunting of this species have caused drastic declines in turtle numbers. This species was previously believed not to occur in the Modoc or Basin and Range regions. And although western pond turtles were not observed during 1994 surveys, reports of observations from other survey crews and the Modoc Refuge indicate that this species may be colonizing the area (Ryno, 1994). Potential open water foraging habitat for this species will not be impacted by the Proposed Project and therefore this species will not be impacted as a result of the Proposed Project.

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APPENDIX E.2

Preliminary Report on Bird Electrocution/Collision Potential

ALTURAS 345kV TRANSMISSION LINE PROJECT:

PRELIMINARY REPORT ON

BIRD ELECTROCUTION/COLLISION POTENTIAL

Draft Report, December 21, 1994

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INTRODUCTION

Birds interacting with operating electrical power facilities can result in either positive or negative impacts. Positive impacts may result from birds using transmission towers, wires, and substations for roosting, foraging posts and nesting. Negative impacts occur when birds become electrocuted on low voltage distribution systems and substations or when they fly into structures (collisions) such as towers and overhead conductors. Other negative impacts such as habitat avoidance and accommodating predators to prey on important species may also occur. Towers provide excellent hunting perches for raptors. This report discusses the probability of birds being electrocuted and/or colliding with a proposed 345kv transmission line routed between Alturas, California and Reno, Nevada. Most birds associated with this project are protected under the Endangered Species Act, Migratory Bird Treaty Act and Eagle Protection Act.

OBJECTIVES

The objectives of this report are to review the probability of birds colliding with the proposed new 345kv transmission line and various alternatives identified in Sierra Pacific's, Proponents Environmental Assessment (PEA), October 1993, determine the biological significance (if any) and propose appropriate mitigation as required under CEQA/NEPA. On the basis of regulatory agency review and previous studies, emphasis placed on *Threatened and Endangered Species, Species of Special Concern (collectively known as special-status species)* and those species that occur in the project area known to be susceptible to utility structure electrocutions and collisions.

Listed species found within the project area include; bald eagle (state, *endangered*/federal, *threatened*), peregrine falcon (state/federal, *endangered*), Swainson's hawk (state, *threatened*) and greater sand hill crane (state, *threatened*). California and Nevada bird "species of special concern" identified in the project area include; American white pelican, white-faced ibis, least bittern, northern harrier, ferruginous hawk, golden eagle, prairie falcon, sage grouse, western snowy plover, long-billed curlew, Barrow's goldeneye, California gull, black tern, double crested cormorant, long-eared owl, and short-eared owl.

STUDY AREA

Sierra Pacific proposes to construct a 345,000 volt overhead transmission line from Alturas, California to Reno, Nevada. The proponents proposed route (approximately 164 miles) and alternative routes are approximately 263 miles long. The study area encompasses a corridor width of approximately 660 feet wide. Seven preferred route segments and fourteen alternative route segments as well as alternative substation sites were reviewed. The project area crosses two physiographic regions within the Great Basin Province: the Modoc Plateau Region and the Basin and Range Region.

General vegetation zones identified in the project area include; sagebrush steppe, yellow pine shrub forest, western juniper savannas and woodlands and desert salt brush scrubs. Due to the variety of vegetation communities and wildlife habitat types, such as freshwater lakes and ponds, cultivated farmland, irrigated pastures, meadows, sagebrush uplands, and riparian corridors the area supports a variety of bird life. For a complete description of study area, habitat conditions and bird species found see the Environmental Impact Report/Statement (EIR/EIS) for the Alturas Transmission Line Project.

METHODS

LITERATURE REVIEW AND FIELD SURVEYS

This study was conducted between April and July 1994. Methods included a literature review of pertinent data on bird electrocutions and collisions with powerlines, and assembling and recording all field data recently obtained by others. Also, additional field investigations were conducted by driving and walking along all mapped alternative routes to view habitat conditions, species present, bird behavior, land uses, topography and other pertinent factors. Telephone interviews and meetings were conducted with state (California & Nevada) and federal regulatory agencies, conservation groups and others familiar with the area and the topic. Species locations, habitat associations and specific bird behavior in the vicinity of the proposed routes were recorded and analyzed.

In spite of this effort, much of the information contained in this report was gathered over a relatively short time period, therefore the data is not complete. Many assumptions were based on existing data and limited field studies. Information was lacking on exact breeding and wintering populations, habitat use, local flight and foraging behavior, prey populations, wind dynamics, topographic features near individual towers, and specific powerline placement and configurations.

RESULTS

BIRD ELECTROCUTIONS

Hallinan described turkey vultures being electrocuted on a 13 kV power pole while sitting on a metal crossarm as early as 1922 (Hollinan 1922). Bird electrocution of raptors was recognized as a serious problem in the United States in the early 1970's.

Emphasis has been placed on raptor electrocutions because they are vulnerable to electrocutions due to their size, distribution, and behavior (Olendorff 1981). They often perch on tall structures that offer them optimal visual contact with prey. Raptors are also highly visible to the public and some are suffering from population declines. Bird electrocutions occur when the wingspan of the bird is greater than the spacing between any two conductors on a power pole or when a bird bridges the gap between a conductor and a ground wire. Bird electrocutions are therefore a problem of low voltage powerlines that are usually less than 69kv, although this figure can vary.

These smaller distribution lines are typically single pole structures with conductors arranged in a variety of configurations but the spacing between conductors is usually less than two feet. High voltage transmission lines, as proposed for this project are usually rated above 69kv, common voltages are 115kv, 230kv, 345kv, 500kv and 760 kv. Typically, the larger the voltage the greater the distance between conductors and thus the less risk of bird electrocutions. The spacing of conductors on transmission line structures is almost always greater than our largest North American bird, except for perhaps the recently reintroduced California Condor.

The proposed Alturas 345kv transmission line will consist primarily of "H" Frame designed steel towers with 3 bundled conductors spaced approximately 20-26 feet apart. In addition, it will carry a combination of overhead shield and fiber optic communication wires located at least 25 feet from the nearest conductor and 20-25 feet from each other. Because of the extensive distance between conductors and the overhead ground wires there is little possibility for bird electrocutions on the transmission towers proposed for this project. However, the new or expanded substations proposed at Alturas and Reno may pose electrocution problems for some birds depending on their design. A discussion of the possibility of bird electrocutions in these substations follows.

Although not part of this project, Sierra Pacific and perhaps other utility companies serving this area have installed "wildlife protective" covers, lowered crossarms and insulated jumper wires to reduce bird electrocutions on much of the overhead distribution system located along Interstate #395, from Reno to Alturas. This will greatly reduce the potential for raptor electrocutions throughout the region.

BIRD ELECTROCUTIONS IN SUBSTATIONS

Birds sometimes enter substations, become electrocuted, and they often cause electrical outages (Stephenson 1991). Different species of birds are attracted to substations depending on the surrounding habitat. The wires, buswork and support structures provide excellent roosting, perching and nesting sites. Heat generated from transformers provides warmth that may attract birds in winter. Species found in existing substations located in the project area include ravens, crows, starlings, owls, hawks, gulls, magpies, and pigeons.

Birds are electrocuted when making phase to phase contact or phase to ground contact with uninsulated equipment. The problem is exacerbated during wet weather.
The proximity of proposed alternative substation sites (Alturas, Border Town, and North Valley Road) to open wild areas provide opportunities for bird electrocution problems. The new substations will consist primarily of 230kv and 345kv components that provide sufficient clearance to minimize bird electrocutions (Erickson pers. comm. 1994).

Problems usually occur on the 13.8 and 24.9 voltage transformer tertiaries where clearances are gapped by birds. Sierra Pacific is now specifying wider clearances on tertiary bushings and prescribing wildlife boots on transformer bushings to reduce animal problems.

The substation proposed at the southern end of the project may be particularly attractive to birds such as crows and raven since there is a general lack of tall trees. However, few bird problems are reported at existing substations in the area (Seigel pers. comm. 1994).

BIRD COLLISIONS WITH POWERLINES

Bird collisions with telegraph lines were reported as early as 1876 (Coues 1876). Avian losses in the U.S. due to collisions with television and radio towers range from 1 to 1.25 million birds (Banks 1979, Mayfield 1967). Bird collisions with powerlines were first reported in 1904 (Emerson 1904). Brown (1993) reports two common conditions contribute to collisions; 1) when a power line or other aerial structure transects a daily flight path used by concentration of birds, and 2) when migrants are traveling at reduced altitudes and encounter tall structures in their path. Collision rates generally increase in low light conditions, during inclement weather such as rain or snow, during strong winds, and when birds are startled by a disturbance (panic flushes) or fleeing from danger. Collisions are more probable along coastal areas, wetlands, valleys that are bisected by powerlines, and within narrow passes where powerlines run perpendicular to flight paths.

Most collisions occur with the overhead shield wire, not necessarily with the larger diameter conductors. This wire is apparently unseen as the bird flares up to avoid collision with the large conductor wires located beneath the shield wires. Meyer and Lee (1981) reported over 80% of the collisions they observed were with the overhead shield wire. Over 82% of the collisions that James and Haack (1979) observed were with overhead shield wires. Several investigators advocate the removal of the overhead shield wire in areas of high waterfowl use (Beaulaurier, 1981, Hugie and Chanson 1989, Meyer 1978). In areas of high lightning potential, the overhead shield wires are essential to protect the transmission system from electrical damage caused by lightening. Shield wires often cannot be removed, because system reliability is highly important.

The proximity of transmission lines to waterfowl concentration areas can increase the risk for bird collisions. Faanes (1983) reports 90% of all mortalities of waterfowl occurred at wetland sites supporting large concentrations of waterfowl. In the northern Great Plains, power lines located within 400 meters of water had higher mortality than power lines located greater than 400 meters from water. Malcolm (1982) reports bird mortalities were greater when power lines were adjacent to a water body or passing directly through a wetland.

Probably, all species of birds are susceptible to collisions with powerlines at some time. However, waterfowl, shorebirds, some raptors and special status species draw the most interest from the public, conservation organizations and the regulatory agencies.
The scientific literature generally concludes; collisions with powerlines are biologically significant only if they effect endangered species, reduce local populations substantially or have cumulative effects (Faanes 1983, Olendorff and Lehman 1986, Thompson 1978, Brown et. al. 1987). Many endangered species have low reproductive rates, therefore any man-induced mortality can have catastrophic impacts on populations.

Whooping cranes have suffered population losses of 25-39% as a result of power line collisions in the Midwest (Morkill 1994). This places powerlines as a significant mortality factor for this species.

The follow summary describes the likelihood of susceptible bird groups found in this project to be impacted by collisions with powerlines. It is recognized, that inferences drawn from previous studies must be used with caution to predict future impacts on similar projects. This discussion attempts to put into perspective two decades of research conducted on bird collisions with powerlines and hopefully provide a better understanding of the issue.

Waterfowl/shorebird collisions

Waterfowl populations along the Alturas transmission line alternative route(s) vary by habitat and season. The largest concentration of waterfowl and shorebirds in the project area (which is within the Pacific Flyway) are in the Modoc National Wildlife Refuge (MNWR) near Alturas, around Honey Lake, and the Biscar Research Natural Area. The rice fields and alfalfa grown in areas below Alturas and in the Madeline Plains attract many waterfowl and shorebirds. Waterfowl and shorebirds are concentrated seasonally in the many lakes, stock ponds, reservoirs and wetlands in valleys that stretch from Alturas south, through the Madeline Plains, and on to Long Valley below Honey Lake.

Large concentrations of waterfowl and shorebirds pass through this area particularly during migration in the spring and fall. Tundra swan, American white pelican and several species of geese, winter and migrate through the area. These large, heavy birds with flocking behavior and poor maneuverability are generally susceptible to power line collisions.

Special status species of waterfowl and shorebirds found in the project area include: long billed curlew, black tern, western snowy plover, western least bittern, white-faced ibis, California gull, double crested cormorant, Barrow's goldeneye and American white pelican. These species have been experiencing population declines as a result of one or more factors relating to habitat disturbance (or loss), such as vegetation conversions, pesticide residues, shooting, grazing, and vehicle encroachment (Remsen 1978). All of the above mentioned species occur as migrants or summer residents of the MNWR. Many of these species are also found in the Madeline Plains and in the Honey Lake basin. The white-faced ibis, and the western least bittern may breed at Honey Lake. Tundra swans and white pelicans use White lake during years of good rainfall (Herron pers.comm. 1994). Approximately 500 to 700 pairs of California gulls breed at Honey Lake. Location of specific nest sites found and preferred habitats in proximity to the project are described in the EIS/EIR.

Many of these species were historically more numerous in other parts of California. Therefore, it is important to maintain their presence here in the Great Basin to offset the heavy losses that have occurred in wetlands in the Central Valley and along the California coast. Susceptibility of individual waterfowl species to collisions with powerlines is not well documented.

According to current research, waterfowl generally fly 10 feet or more above the elevated groundwire on transmission line systems. Hartman (1992) reported 80% of non-passerine birds flying over a new 115kv powerline during a three year study. Mousseau (1993) studying waterfowl collisions over 5 different high voltage lines crossing the St. Lawrence River noted 94.4% of the birds flew over the overhead groundwire.

Other observers (Hugie and Chanson 1989; Lee 1978; Meyer 1978; Wilden 1982) all report 85% to 99% of the waterfowl they observed flew over the overhead groundwire. In spite of these data, some waterfowl do collide with transmission lines, but the numbers reported by investigators has generally been low.

Meyer (1978) reported collision rates of .07% (103 collisions in 146,850 fly over crossings) at Bybee Lake and 0.05% (78 collisions in 156,975 crossings) at Lower Crab Creek. James and Haak reported an average collision rate of 0.51% (965 collisions in 189,267 crossings) at 5 study sites. Hugie and Chanson found similar results. They report collision rates from .35 % to .03% following investigations at 5 different sites. Willdan Associates report a waterfowl collision rate of .003% (33 collisions in 1,092,000 crossings) for birds crossing a transmission line at Crow Butte Island, along the Columbia River. Few studies provide data on individual species.

Faanes (1983) provided the following breakdown in his observed 633 mortalities at seven study sites in the Northern Great Plains: 166 waterfowl (26.2 %), 143 gulls (22.6%), 62 cranes (9.8%), 52 shorebirds (8.2%), 11 grouse (1.7%), and 10 pelicans (1.6%). The U.S. Navy (1992) found 633 dead birds during a three year study of a newly constructed 115kv transmission line serving Mare Island in California.

They found 15 species of shorebirds, with black-bellied plover, western sandpiper and dunlin the most commonly collected species. These species were more vulnerable to powerline collisions than other shorebirds. The USN reports powerline mortalities will not adversely affect population levels of gulls, terns, raptors and passerines, but they expect the powerline could increase annual mortalities of the black-bellied plover by 1.0 % to 2.2%, sandpipers by 0.02% to 0.06%, and dunlin 0.1% to 0.4%. These results are confounded, since the transmission line studied also contained a smaller 21kv distribution circuit on the same poles.

Many waterfowl studies previously conducted examined areas where high bird concentrations and power lines exist to see if they could determine "worst case" mortality rates. Many previous bird mortality studies document powerlines located in wetlands, water bodies and other high bird concentration areas.

Utility line routing today attempts to avoid wetlands and other high bird concentration areas. The transmission systems, habitat conditions, weather, investigators, data collection methodologies and other variables were all different in these previous studies but the data suggests that waterfowl and shorebird collisions with transmission lines are relatively small. Without data on species populations within specific habitat areas, flight patterns and location of specific towers it is not easy to predict the magnitude of waterfowl collisions for this project at this time.

However, with careful routing and specific mitigation prescribed, it is probable that mortalities that may occur will not be biologically significant to the overall populations of waterfowl and shorebirds that reside or migrate through the Great Basin area.

Raptor Collisions

Olendorff (1986) conducted a worldwide search for unpublished data on raptor collisions with all overhead lines, including powerlines. Information was gathered from scientific journals, falconers, raptor rehabilitators, raptor research foundation, U.S. Bird Banding Laboratory, state and federal biologists and electrical utility companies. He reports 88 raptor collisions, covering a period of 20 years (1965-1985) from seven countries including; Canada, Great Britain, Australia, Malawi, Sicily and Zimbabwe and the United States. The U.S. reported the most collisions, 72. See Table 1 for a list of raptor mortality data reported for telephone lines, electric distribution lines and high voltage transmission lines. Of the 88 reports, 26 (36.1%) were reported collisions with electric transmission lines. The peregrine falcon (24), bald eagle (15), golden eagle (9), and red-tailed hawks (7) were the species most commonly reported (mortalities in parenthesis).

Other *special status species* reported in that data set that occur in the Alturas Project area include, short-eared owl (4), Swainson's hawk (3), prairie falcon (2), long-eared owl (2), and northern harrier (1). Olendorff received no reports of ferruginous hawk mortalities.

Olendorff shows some relevant factors that contributed to raptor mortalities with utility lines (Table 2). Juveniles, not adults were found most often (except red-tailed hawks), steel lattice towers were the most common tower design and weather conditions had little effect on most raptor collision mortalities. In addition, Olendorff provides data on age classes, types of lines, and fatality rates of reported raptor mortalities in Table 3. From these data, subadult mortalities were reported most often (except for buteos), buteos collide with transmission lines (T/L) more than distribution lines and telephone lines, and transmission line collisions were always fatal for both eagles and falcons but not always for buteos.

Table 1. Raptor Mortality Data Reported for Telephone Lines, Electric Distribution Lines, and High Voltage Tranmission Lines from Worldwide Search 1965-1985 (Olendorff et al 1986).

	Total* Number of Records with Known line Type	Percent of Collisions with Telephone Lines	Percent of Collisions with Distribution Lines	Percent of Collisions with Transmission Lines
All Falcons	19	15.8 (n=3)	68.4 (n=13)	15.8 (n=3)
All Raptors	23	8.7 (n=2)	52.2 (n=12)	39.1 (n=9)
All Buteos	11	18.2 (n=2)	27.3 (n=3)	54.5 (n=6)

* Raptor collision mortality data collected from worldwide data inquiry covering 20 year period.

Table 2. Factors that contributed to raptor collision mortalities with utility lines reported in Olendorff (1986)

Peregrine falcon (24)

AGE: 10 adults, 13 sub adults, 1 unknown
WEATHER: 0 weather
STRUCTURE: 3 transmission- 2 metal towers, 1 unknown
SEASON: 4 fall, 2 winter, 1 spring

Bald eagle (15)

AGE: 7 adults, 8 sub adults
WEATHER: 1 adverse weather, (only 5 reported weather)
STRUCTURE: 5 transmission- 3 types known, and only 1 collided with "H" frame type
SEASON: 9 spring 3 winter

Golden eagle (9)

AGE: 3 adults, 5 sub adults, 1 unknown
WEATHER: 2 adverse weather
STRUCTURE: 4 transmission-
SEASON: all seasons

Red-tailed hawk (7)

AGE: 5 adults, 2 sub adults
WEATHER: 1 adverse weather
STRUCTURE: 4 transmission-all metal towers (lattice?)
SEASON: 3 fall, 2 winter, 1 summer, 1 unknown

( ) Number of raptor collision mortalities reported from worldwide data inquiry covering 20 yrs., 1965-1985.

Table 3. Age classes, types of lines and fatality rates of raptors that collided with utility lines reported in Olendorff (1986).

	Total w/kwn age class	Percent adults	Total w/kwn line type	Percent col w/TL	Total w/kwn fate&line type	Percent fatal
Falcons	29	41	19	16 (n=3)	16	100 (n=3)
Eagles	23	44	23	39 (n=9)	20	100 (n=9)
Buteos	10	70	11	55 (n=6)	8	33 (n=6)

Over 60% of the buteos found under power lines recovered following a collision. Olendorff suggests the swift flight of peregrines and heavy weight of eagles (compared to buteos) could result in their higher mortality figures. He studied eagle flight patterns for two years in the vicinity of three proposed transmission line routes crossing Cache Creek (Clear Lake), California. Approximately 50 to 60 eagles winter in the area moving from evening roosts to daily feeding areas bisected by a proposed 230 kV steel lattice transmission system. He observed eagles flying through drainages, canyons and saddles. They also flew across low ridges, over valleys, and were concentrated above high ridges. Most eagles flew at elevations above 100 feet from the ground. Comparing eagle flight height data from Olendorff study (Table 4) and this project, tower design and tower placement can easily reduce the risk for eagle collisions.

Raptors are generally not prone to collisions with powerlines. Olendorff (1986) says raptors are not predisposed to powerline collisions, because they have keen eyesight, they soar or use relatively slow flapping flight, and they are generally maneuverable in flight. They also learn to use utility poles and structures as hunting perches and nest sites and they become conditioned to the presence of lines. And raptors, unlike waterfowl do not fly in "V" formations when in groups, with their position and altitude determined by other birds of the flock. However, when they are actively pursuing prey, engaged in courtship flights, defending territories, and escaping predators they become vulnerable to collisions.

Faanes (1983) reports power lines in the northern Great Plains are not a serious hazard to diurnal raptors such as the prairie falcon, red-tailed hawk, Swainson's hawk, ferruginous hawk or to owls. Olendorff (1986) concludes, "On the basis of our data, collisions with utility lines do not result in a discernible effect on the population dynamics of raptors, except in the case of critically endangered species of when rare, threatened, or endangered species are experiencing population declines. Collisions with utility lines apparently is a random, low level and inconsequential mortality factor of raptor populations. Any other conclusion is counter to available data."

The project area offers much habitat for a variety of raptors. The area is used for nesting, wintering and as a migration corridor. The bald eagle (winter resident) and the peregrine falcon (migrant) and Swainson's hawk (summer resident) are threatened/endangered species which occur in the project area. *Special status species* found in the project area include the golden eagle (year-around resident), ferruginous hawk (winter resident), northern harrier (year-around resident), long-eared owl (year-around resident) short-eared owl (year-around resident), and the prairie falcon (migrant).

The known nest sites for all special status raptor species in relation to alternative routes for the project are shown in the EIR/EIS. The proposed project should have minimal effect on population levels of most special status raptor species. However, two raptor species that occur within the project area seem most vulnerable to collisions. The bald eagle and the peregrine falcon may incur unwarranted collision risk (without mitigation) based on what we currently know.

Number of Bald Eagle Flights Through Altitude Intervals in Geothermal Public Power Line Corridor

	Peachtree	Cache Creek Reservoir	North Fork
ghts[1]:	(106)	(38)	(119)
flights ltitude			
	88 (83.0)[2]	21 (55.3)	49 (41.1)
	59 (55.7)	16 (42.1)	36 (30.3)
	68 (64.2)	17 (44.7)	50 (42.0)
	62 (58.5)	17 (44.7)	52 (43.7)
	55 (51.9)	17 (44.7)	48 (40.3)
	26 (24.5)	8 (21.1)	20 (16.8)

ghts passed through more than one altitude range.

in parenthesis is percent of total flights through corridor which passed through the altitude range.

Bald eagle-
The bald eagle is a winter resident, found near water, wetlands, marshes, rivers, and lakes. It feeds on fish, waterfowl, mammals and carrion. Eagles commonly hunt from the air and from an exposed perch. Since a sizable eagle population occurs in the northern part of the project area, and it is an endangered species (recently proposed for downgrading to "threatened" status due to population recovery), overall individual mortality is of great significance. The risk of eagle collisions is greatest along alternative routes "A" & "B" near Alturas. A few eagles use the Honey Lake/Long Valley area for feeding. A large wintering population of bald eagles occurs in the vicinity of South Fork Pit River Valley and the Warm Springs Valley (Jackman pers. comm. 1994). Approximately 25 eagles winter between Canby and Rattesnake Butte. Jackman reports eagles foraging along the South Fork Pit River, and associated irrigation canals as far south as Likely. Ryno, of the Modoc National Wildlife Refuge (MNWR) reports peak winter eagle populations around 10-15 on the refuge (Ryno pers. comm. 1994). Bald eagles will fly east and west across Segments "A" & "B" moving from night roosts near Canby to foraging areas on the MNWR increasing the risk for collisions. The closest eagle nest sites are in the Devils Garden area several miles west of the project.

Approximately four to eight eagles are reported wintering in the Honey Lake/Long Valley area. From 5-15 eagles use the northeast portion of Honey Lake in winter, and 9-12 eagles are found in the Honey Lake Waterfowl Management Area. This number has increased from the 1980's when numbers ranged from 4-6 eagles. Jackman observed eight eagles on or near an unidentified carcass at the confluence of Susan Creek and Honey Lake in February 1994. Interestingly, Jackman found no tree perches outside the refuge and only scattered waterfowl. He found scattered cottonwoods within the refuge that could provide perch habitat for eagles. There are no known night roost in the Honey Lake area. The nearest possible roost is the forested areas in the Diamond Mountains, located two-three miles southwest of Honey Lake (opposite direction from routes). Although Segment "O" comes within one mile of Honey Lake, it seems unlikely that this would pose a significant risk to eagles. The lack of trees, no nearby nest sites, no known roost sites in the immediate area, and the high visibility of the line in this terrain should pose little risk to eagles. Although bald eagles don't prefer using man-made structures for perching, they may use the large crossarm of the transmission towers for perching since so few trees exist in the area (Jackman, pers commun. 1994)

Peregrine falcon-
Peregrines are considered a rare or uncommon migrant for the area. It is found in marshes, wetlands, cliff areas and around tall buildings and other structures where abundant prey is available. Peregrines feed on waterfowl and a variety of passerines. An eyrie in the area northeast of Segment "O" suggests that peregrines are continuing their range expansion into former suitable habitat .

The peregrine falcon is increasing its population dramatically throughout the West. In spite of its vulnerability to natural and man-caused mortality factors (including powerline collisions) peregrine populations are recovering well in California.

It is believed that the swift flight of peregrines pursuing prey leads to inattention to obstacles in their environment and sometimes results in fatal collisions. This would suggest that little can be done to reduce the collision risk. However, line placement and marking the powerline may provide reasonable protection. If we assume that peregrines are feeding on birds from the Honey Lake area, the obvious flight path will require crossing Segment "O". The Honey Lake Waterfowl Management Area attracts 20,000 ducks and geese each fall.

Golden eagle-

Golden eagles are resident and are found in open grasslands, savannas and woodland areas throughout California. Schlorff (1986) reports that the Great Basin area with its rugged mountain ranges and vast expanses of sagebrush make for the best golden eagle habitat in the state. This species is known to nest on power poles. It hunts by soaring and from high perches. Golden eagles occur in scattered locations along the entire transmission line route. One nest was located within one mile of preferred Route "A" near West Rock Creek. At least nine sitings of birds flying or perched have been reported between Alturas and Long Valley Creek since the spring of 1993. An active nest is located within 1/2 mile of preferred Route "C" below Likely. This nest is less than 1/2 mile from an existing powerline and a road. Williams (1987) described the benefits of powerlines to golden eagles. Golden eagles use power lines for nesting, perching, hunting and nocturnal roosts. Within the project area, golden eagles may use the power line as an opportunity to perch above sage grouse leks and cause some unwanted mortality or relocation of these important breeding areas.

Swainson's hawk-

Swainson's hawks were once abundant breeders in California, and they nested in Northeast California down to the Owens Valley (Bloom 1980). Bloom reports they are seen infrequently and have suffered the most severe population decline of any bird in the state. In 1979, the statewide population was estimated at 375 pairs, a 91% decline from an estimated population of 4,284 to 17,136 pairs from historical data. Reasons for population declines include habitat conversion from grasslands to croplands, shooting and possible pesticide contamination. This species is considered a summer resident in the project area. It is found in open grasslands, woodlands and savannas and it preys on small mammals. At least 13 sitings of Swainson's hawks have been reported within the project area from below Alturas to Honey Lake. Most birds were reported from the Madeline Plains. However, only 1 nest has been located along the southern part of Segment "B".

Ferruginous hawk-
The ferruginous hawk is a wintering migrant, occurring in the arid grassland areas of level and rolling terrain. In the winter they are often found in agricultural pastures, and fallow fields where they prey upon ground squirrels and jack rabbits (Snow 1974).
It hunts by soaring, hovering and from exposed perches. Remsen (1978) says this species has not been a proven breeder in California in 1978.

Only 4 sitings of ferruginous hawks have been reported. All were seen several miles from alternate routes, except for the one found nesting. One nest site has been found within the preferred Route "C" and another nest is reported by CDF&G about 3 miles west of preferred Route "K" in the Madeline Plains.

Northern harrier-
The northern harrier is a resident bird, occurring in open habitats with some herbaceous cover and woody growth. Breeding and wintering harriers can be found in wetlands and grasslands feeding on microtine rodents, passerine birds and occasionally waterfowl (Palmer 1988a). It hunts by flying low to the ground. Harriers will perch on power poles, fence posts, and on the ground. It also nests on the ground. At least 14 sitings of northern harriers have been reported for the study area. They have been seen most often in the wetlands below Alturas and in the Madeline Plains area. No nest have been found.

Prairie falcon-
The prairie falcon is a migrant and resident species in the project area. It is found in deserts, foothills and mountain valleys throughout California. Wintering falcons are often found in agricultural areas where they feed on horned larks, mammals and reptiles (Palmer 1988b). This species often perches on power poles. It hunts from exposed perches and conducts rapid pursuit of prey. Sitings of at least 10 individuals have occurred within the project area. A prairie falcon was found dead under an existing guyed power line up on the tablelands, south of Alturas. They have been seen in scattered locations along the project area. An eyrie has been located 1 1/2 miles from preferred Route "C" .

Long-eared owl-
The somewhat secretive long-eared owl is a permanent resident of the project area. It is found in deciduous woodlands, coniferous forests and sagebrush desert. It feeds mainly on rodents. Remsen (1978) reports the long-eared owl was still fairly common in willow thickets along the Susan River and other streams in the Honey Lake area in 1978. The reasons for population declines include habitat loss, road kills, shooting and harassment. . At least three long-eared owl nests with young have been found in the vicinity of preferred Route " Q " All three nests are approximately 1/2 mile from the route in the south end of Honey Lake Valley.

Short-eared owl-

Short-eared owls are also permanent residents of the project area. They nest on the MNWR. They are found in open country with short vegetation, marshes, and meadows with good cover. It hunts for small rodents in a waverly flight or taking up a perch site on a small post (Udvardy 1977).

Larsen (1987) reports two nests found at Honey Lake Wildlife Area, and five nests at Ash Creek Wildlife Area. Reasons for decline include loss of habitat, grazing and shooting. Short-eared owls have been sited along Hwy. 395 over 6 miles east of the preferred Route "C", south of Alturas.

Crane collisions

The main cause of mortality for the whooping crane, a federally listed endangered species is collisions with powerlines. Collisions with powerlines occur during migration, when birds stop to rest and feed in areas bisected by powerlines (Krapu 1984). The greater sandhill crane, a related species is a summer resident in the northern part of the Alturas project area. Major crane nesting areas in northeastern California include; Surprise Valley, Jess Valley, Pit River Valley, near Davis Creek in Modoc County, and Ash Valley and Willow Creek Valley in Lassen County (Schlorff 1988). Nesting occurs on the MNWR and in suitable habitat south through the Madeline Plains and Secret Valley to Honey Lake. These birds prefer shallow water for night roosting, wet meadow habitat for nesting and grain fields for feeding (Littlefield 1989). Crane surveys conducted in 1992 report 36 breeding pairs, 56 non-breeders, and 14 colts fledged on the MNWR (Ryno pers. commun. 1994). Daily movements of birds from night roosts and nesting areas to feeding areas that are bisected by transmission line routes "A" and "B" will increase the risk of collisions.

Population levels fluctuate dramatically from year to year but the overall trend has been down due to such threats as habitat loss, predation, and cattle grazing. For most of the project area the transmission line has been routed in a north to south orientation along the edges of valleys and plains away from bird concentration areas, reducing much of the risk for crane collisions. However, birds that may move east and west away from the project area to wetland areas such as Canby, Jess Valley and Ash Creek Valley will incur additional risk while passing over the line. Littlefield reported a breeding crane collision with a powerline in 1988, below Alturas. Schlorff reports as many as 22 cranes died colliding with a power line while moving from a roost site on a foggy morning (1988). The risk for collisions with powerlines proposed for this project is greatest near Alturas, in the Madeline Plains, Secret Valley and near Honey Lake.

ASSESSMENT OF PROJECT ALTERNATIVES

Several distinct factors are recognized to influence bird collisions with wires. Brown (1993) divides these factors into two major categories: species characteristics and environmental characteristics. For species characteristics; habitat use, body size, flight behavior, age, sex, and flocking behavior are the most critical. Environmental characteristics include; weather, land use and ownership, line placement, orientation, and configuration. A brief summary of these characteristics follows:

*** Habitat Use**

To supply their needs, birds are likely to fly over powerlines several times daily to move to and from feeding, roosting, nesting areas, increasing their probability for collisions. Raptors that use poles for perching, hunting and nesting may increase the probability for collisions because of their frequent exposure.

*** Body size & flight behavior**

Large, heavy birds with long wingspans are less maneuverable in flight and are more apt to collide with powerlines. Also birds in daily flights at low altitude and high speed are vulnerable to collisions. Birds that fly after dusk and before sunrise aren't flying when visibility is best and they are more apt to encounter fog or other limiting visual conditions.

*** Age & Sex**

For some species, juvenile birds are less experienced flyers and they are less familiar with their environment, therefore they are more vulnerable to collisions. However, in other species, seasonal courtship and pursuit flights distract adult male birds and they are believed to be more vulnerable to collisions.

*** Flocking behavior**

Species that congregate in large flocks are more prone to collisions than solitary species.

*** Weather**

Inclement weather can increase the risk of collisions. Strong winds, fog, snow, dense cloud cover and rain can reduce visibility. Birds will often fly lower during inclement weather putting them in greater danger of colliding with transmission lines.

*** Land use & ownership**

Land uses that provide food, water and cover can attract birds and increase the collision risk if powerlines are present. Also, disturbances to these habitats from vehicles, hunting, hazing to control crop depredation may cause birds to panic-flush and collide with powerlines.

*** Line placement, orientation and configuration**

The closer the powerline is to feeding, roosting and nesting areas the greater the probability of collisions. Tall trees that are as high or higher than a powerline will provide a natural screen that directs birds in flight, to fly up and over powerlines. Mountain passes, river valleys and shorelines tend to be bird concentration areas which if bisected by a powerline could increase bird collisions. Placing powerlines perpendicular to local flight paths increases the bird collision potential. Placing the powerline conductors (wires) in a horizontal plane versus a vertical plane also tends to reduce the area (hazardous region) the bird must fly through.

Habitat loss and degradation are having the greatest cumulative impact on long-term local and regional waterfowl populations. According to Bartonek (1988) dabbling duck populations along the Pacific flyway were down 12% from a 10 year average (1978-1988), snow geese populations down 17% from 10 year average and tundra swans down 7% from their 10 year average.

To examine the potential for bird collisions from the operations of the Alturas 345kv Project a comparison was made of known species and environmental characteristics identified along the alternative routes. See Table C.3-15 in the EIR/EIS. Following this evaluation a subjective rating of High, Medium and Low was assigned to reflect the potential collision risk of specific bird species found along the many routes.

MITIGATION

BIRD ELECTROCUTIONS IN SUBSTATIONS

The utility industry has expended much effort to reduce birds found in substations because they cause service interruptions and electrical failures. Florida Power & Light (FP&L) found that "piperack" designed substations resulted in most of their bird related problems. Problems are interpreted to mean electrical outages, and outages often result in bird mortalities due to electrocutions. Piperack designed substations accounted for 85% of the interruptions. They found 68% of their outages occurred on the low side transformer switch and the adjacent transformer bus (Quincy 1993). Cornell University, conducting research for the electrical utility industry reports six electric companies indicated 99% of all animal-caused faults occurred on the low voltage side of substations (Enck and Brown 1989).

FP&L found no service interruptions from birds in substations of the "Moduflex" design. Ontario Hydro reports constructing barriers to entry and equipment protection appear to be the most practical, easiest to install and most cost effective solutions at existing substations. Enck and Brown used eight criteria to evaluate the effectiveness of animal control devices in existing substations and they recommend; bus support guards, bushing guards, heat shrinkable material on electrified equipment, insulation on cables and wires and larger insulation on the low voltage side of the substation.

Hydro Quebec found exterior lighting attracted large concentrations of nocturnal insects that would rest on equipment during daylight and subsequently increase bird use during the day (Philip de Laborie 1984). In some cases they eliminated lighting, and in others they replaced mercury bulbs with sodium bulbs that do not emit the blue band spectrum that attract insects. Designing new substations to eliminate the attractions of perching, roosting and nesting sites will minimize bird electrocutions. Retrofitting existing substations with cost effective devices as described above will minimize outages, lower maintenance costs and reduce bird mortalities in substations. Providing wider clearances on tertiary bushings and installing, "wildlife" boots on all transformer bushings as planned by Sierra Pacific will reduce bird electrocution risks (Erickson pers. commun. 1994). Wildlife boots are custom-fitted insulated coverings (e.g., vinyl, rubber) that protect animals from energized surfaces.

BIRD COLLISIONS WITH POWERLINES

Mitigation is generally required when transmission line projects are known to impact important species, such as listed threatened and endangered species. For other species, social and biological criteria should be developed to determine the significance of collision mortality before mitigation is implemented (Hoopes 1991). Mitigation is recommended for specific areas along the transmission line where there is already a high probability of avian mortality. Failing to implement mitigation now while awaiting the results of future studies may result in wasted limited resources.

This should not preclude future mitigation options. Once the line is built, additional mitigation may be required for avian mortality and retrofitting the lines or other modifications are still feasible.

The Avian Powerline Interaction Committee (APLIC) suggests that management options should not be selected and implemented without gathering and evaluating data on bird movements in the vicinity of the proposed or existing line (APLIC 1994). Others have suggested that whenever some level of loss of birds and habitat is understood and is inevitable it may be prudent to implement a reasonable program of mitigation without conducting additional studies or waiting until the project is operational to examine impacts (Hoopes 1991). The study of populations and specific bird movement patterns of all special status species found along the Alturas 345kv project is beyond the scope of this report. A reasonable effort has been conducted to understand the interaction potential of special status species found in the project area and provide cost-effective mitigation recommendations to reduce expected adverse impacts.

Alternative Mitigation Options

Research to date identifies the following options which may be considered for lessening bird collision risks with powerlines. A brief summary explanation follows each measure:

1) Careful route planning to avoid sensitive bird species. Reason suggests that transmission lines should be routed to avoid known bird concentration areas. Generally, this involves avoiding dedicated wildlife refuges, waterfowl management areas, wetlands and known migration corridors. It may also include routing transmission lines near natural physical features, such as trees and land masses. Placing a transmission route along a tree stand to naturally guide birds up and over the line will reduce the collision risk. Also, placing the route parallel to rivers, natural ravines and valleys that are traditional flight corridors should reduce the frequency and the number of birds that must cross the powerline. Much planning has gone into this project with a variety of early screening studies that eliminated alternatives that would impacts birds as well as other wildlife (RMI 1994). Lines placed from one to one and one-half miles from nesting cranes, eagles and waterfowl are believed to result in little collision risk (Lee 1978, Thompson 1978, Faanes 1987, Brown and Bizeau 1987).

2) Undergrounding transmission lines where feasible.

Obviously, undergrounding power lines eliminates the problem of bird collisions. However, this is not always practical or cost-effective. As the voltage increases for constructing power transmission systems, so does the cost of undergrounding. The cost of undergrounding can range from 10 to 30 times that of overhead construction. Undergrounding comes with additional environmental impacts as well. In voltages over 69kv, oil filled, pipe-type cables are normally used to eliminate voids and any moisture pockets in the cable insulation (APLIC 1994). Undergrounding for 345kv seems economically and environmentally unfeasible for this project.

3) Habitat modification and land use.
Habitat modification may include using natural vegetation or man-made structures to shield power lines, modifying habitat near powerlines to change its attractiveness to birds, and modifying land use to reduce potential disturbances to birds near power lines. This may not be possible in most cases because powerline rights-of-ways are generally not purchased and their use for energy transmission is granted by easements that limit other uses. Additional approvals and compensation would have to be agreed upon with individual land owners for any habitat modifications or land use alterations.

4) Modifying tower and line structures for specific locations
Tower height can be raised or lowered to encourage birds to fly over or under powerlines. Some transmission line power pole designs seem to provide less risk to birds than others. For example, the "H" frame design poles, as in this project are not implicated in bird collisions as often as some other transmission tower designs. On "H" frame designed towers, all three conductors are oriented in a single horizontal plane, presumably providing fewer opportunities for collisions. Typical lattice towers result in conductors being oriented in a vertical plane posing more opportunities for birds to collide with wires when moving through the air. However, clustering several transmission line routes within a single corridor may result in less collision risk as the many lines are believed to be more visible to birds.

5) Marking powerlines to make them more visible.
Marking powerlines to make them more visible to birds has been demonstrated in a number of studies to reduce bird collisions. Recent studies (Beaulaurier 1981, Morkill 1991, and Brown 1993) report collision rates reduced from 28 - 89% depending on the species involved and the marking device. Early studies examined the use of ribbons, plastic strips, fishing floats, and orange aviation marker balls (Beaulaurier 1981). The average reduction in mortalities was 45%.

Koops and de Jong (1982) marked powerlines in the Netherlands with plastic spirals, called, "bird flight diverters". They claim mortalities reduced as much as 57% to 89% for various species. Marking powerlines in the United States usually involves the installation of "aviation marker balls," or "bird flight diverters" on the overhead shield wire to make the lines more visible.

Yellow colored markers used in Morkill and Brown studies are believed to be highly visible to the avian eye (Beaulaurier 1981). Morkill and Brown both conclude, " marking powerlines is a highly effective way to reduce collisions in specific problem areas. However, marking is neither necessary nor appropriate over large areas with low collision potential." (APLIC 1994). It is also important to note that when considering marking powerlines; safety codes, ice loading, wind resistance, vandalism and social (esthetics) and economic factors must also be evaluated. Marking is usually more appropriate when the overhead shield wire cannot be removed.

Figure 1, illustrates a typical bird flight diverter used to reduce bird collisions on transmission lines. Aviation marker balls have also been used to mark powerlines, but they have resulted in additional problems. Aviation marker balls have been installed effectively on a distribution line serving the MNWR to reduce crane and waterfowl collisions. Prior to installing the balls, from 0 to four cranes were killed yearly, now only one bird is killed every other year and it usually occurs with fog (Ryno, pers. commun. 1994).

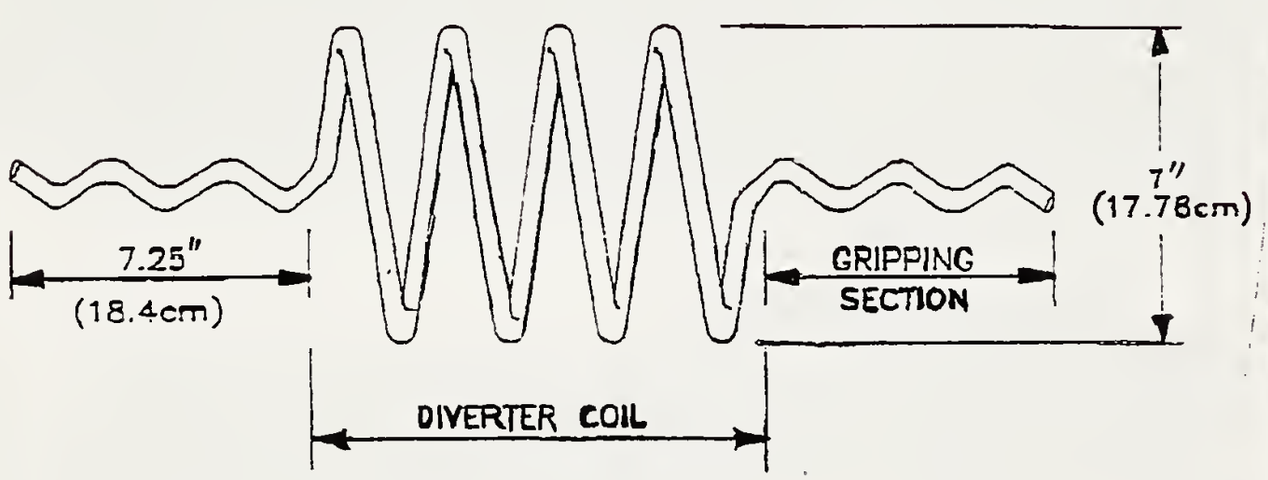
Aviation marker balls, while proven effective, cause esthetic concerns, become targets for indiscriminate shooters, increase line wind-loading, trap bird talons, coil wires together and can cost more than other options that work as well.

6) Removing the overhead groundwire, where feasible.
The removal of the overhead groundwire (shield wire) has been shown to reduce bird collisions on powerlines (Beaulaurier 1981, Brown et. al. 1987). Since these wires are usually located above the conductors and they are smaller in diameter, birds apparently flare up suddenly to avoid hitting the conductors only to fly into the overhead shield wire. Overhead groundwires cannot be removed if the area is subject to high lightning levels, since reliability of service would be compromised. If the isokeraunic level (lightning storm days) is high, the powerline must have shield wire protection. Sierra Pacific has stated that because of the incidence of lightening, ground wire removal is not an option on this project (Owens pers comm.)

Mitigation Recommendations

Waterfowl and shorebirds-
Waterfowl and shorebird concentration areas have been avoided by most of the transmission line route alternatives. The preferred route bypasses most dedicated waterfowl areas such as MNWR and Honey Lake WMA. It also avoids the many lakes, reservoirs and stock ponds and wetlands that occur in the northern part of the project area.

FIGURE 1. Typical bird flight diverter used to reduce bird collisions with powerlines (Avian Powerline Interaction Committee 1994).



NOTES:
1. OVERALL LENGTH: APPROX 30"(76.2cm)
2. ROD DIA: 0.375"(0.95cm)
3. ENDS ARE SANDED
4. MANUFACTURED FROM GREY OR YELLOW HIGH INPACT P.V.C.

White faced ibis roost on the refuge and feed in the surrounding areas toward Canby and the rice fields south of Alturas. Some areas that support a variety of waterfowl but in smaller numbers are along the canals below Alturas, within the Madeline Plains, within Secret Valley and in isolated wetlands near Honey Lake and Long Valley. The dispersion of individual nesting waterfowl and shorebirds, their relative density, and flight behavior in the vicinity of the transmission line routes suggests that mitigation for waterfowl along much of the transmission line is unwarranted at this time. However, in the vicinity of the South Fork Pit River crossing, BFD's are recommended to make the line more visible for large less maneuverable birds such as white pelicans, Tundra swans, geese and cranes that enter the MNWR. Lowering towers and tree planting is also recommended here to provide a natural screen that will help reduce the risk of bird collisions.

Following an assessment of species present, numbers and specific bird flight patterns east of the Biscar State Wildlife Area, BFD's should be placed on several spans of preferred Route "L" in the vicinity of Secret Valley. Similarly, waterfowl (geese and ducks) were seen in isolated wetlands at the confluence of Long Valley and Dry Creek Valley. If this area funnels birds moving back and forth among these wetlands, several spans of preferred Route "Q" or Alternate Route "P" could be fitted with BFD's to reduce the risk of bird collisions.

Bald eagle-
The proximity of nesting eagles, their relative density, federal and state status, and flight behavior in the vicinity of some alternative routes may increase the risk of collisions with the powerline. To provide minimal risk to bald eagles that winter in the project area the following is suggested:

In the vicinity of Alturas-
Since there is little opportunity to reroute (both routes "A" or "B") the power line further west (crossing the South Fork Pit River) to avoid birds that may be moving from Canby to MNWR, efforts to modify the transmission line seem most practical.
a) Tower, and particularly conductor height should be reduced below 100 feet at the South Fork Pit River crossing to avoid the zone most eagles fly through (above 100 feet) as observed in other eagle flight studies in similar terrain. Keeping the powerline as low as practical will encourage birds to fly safely over the line as they pass through the valley.
b) With landowner approval, poplar trees (*Populus deltoides sulan*) should be planted on one side of the transmission line to encourage birds moving east to west to fly up and over the powerline. These trees may also encourage other raptor use of the area since there are few large perch trees in the valley.
c) While awaiting the growth of trees, bird flight diverters (BFD's) should be installed on the overhead shield wire along selected spans of the transmission line that cross the South Fork Pit River. These devices will help alert eagles and cranes to the presence of the new powerline.

Near Honey Lake-
The birds that forage at Honey Lake are believed to be roosting in the Diamond Mountains located 2-3 miles southwest from Honey Lake (Jackman pers. comm. 1994). The flight path of eagles moving east and west are not bisected by the transmission line, therefore collision risk is small and mitigation seems unwarranted at this time.

Peregrine falcon-
The risk of peregrine falcon collisions with the Route "O" is certainly greater than if the line wasn't there. But, the distance from the eyrie, the presence of other powerlines in the area, and the 3 mile distance to Honey Lake (feeding area) may not significantly increase the risk for collisions. Most peregrine collisions have occurred when birds were chasing prey near feeding areas. This species, unlike many other raptor species, has chosen to nest on large buildings, bridges, and other unnatural structures. Peregrine falcons have nested for decades near power plants and related transmission lines, and a few powerline collisions has been reported. The peregrine falcon tolerates much of man's rude activities and continues to expand into areas of increased risk. The transmission line could pose additional risk during periods of fog.

The proposed tower centerline is at approximately the 4,010 foot elevation level at ground level, and the towers are approximately 100 feet tall. This would give the bird at least a 90 foot clearance. Lowering the towers as much as possible would provide an even greater margin of safety. The installation of colored, BFD's on the overhead shield wire on several spans directly in front of the eyrie will reduce the collision risk further. Monitoring this area for peregrine flight behavior and collision potential, following construction would provide more insight into the need for any additional mitigation.

Golden eagle-
The potential risk for golden eagle collisions is small. The low number of nests (1) and proximity to the transmission line route, particular flight behavior and design and high visibility of the line suggests that mitigation for powerline collisions is unwarranted.

However, the presence of golden eagles, and ravens is seen as a potential predation threat to sage grouse, since they likely will use the transmission towers as hunting posts. Golden eagles and ravens will use the towers, particularly in open areas where trees are scarce. To minimize the threat of predation near leks, steel and fiberglass shields or custom pegging should be installed on selected transmission poles to discourage bird perching (Engel et. al. 1993). The shields or pegging should be installed on selected towers for approximately one mile on either side of established leks along preferred Route "K," Sections 22, 27 & 34, and alternative Route "J", Section 27. Similar devices, which have been placed on large transmission towers by PacifiCorp (Portland, Oregon) were effective in keeping ravens off 500kV transmission towers between Oregon and Idaho.

Swainson's hawk-
Due to a paucity of nest sites (only 1 located near Segment "B") within study corridors, particular flight behavior and low susceptibility to power line collisions, mitigation seems unwarranted at this time.

Ferruginous hawk-
Due to a paucity of nest sites (only 2 located within preferred Routes "C" & "K") within study corridors, particular flight behavior, low relative density, transmission line design and low susceptibility to power line collisions, mitigation seems unwarranted at this time.

Prairie falcon-
Due to a paucity of nest sites (only three located > one mile from routes) within study corridors, low relative density, and transmission tower design mitigation seem unwarranted at this time.

Northern harrier-
Due to a paucity of nest sites (none found), particular flight behavior, transmission tower design, and low susceptibility to power line collisions, mitigation seems unwarranted at this time.

Sand hill crane-
Efforts to mark power lines to reduce crane collisions has been effective. Several recent studies have statistically compared marked and unmarked powerlines to evaluate these techniques and to accurately measure reductions in crane mortalities (Morkill 1991, Brown 1993). In a total of 3,080 crane flocks observed flying over marked and unmarked transmission line spans, most of the birds (1,968 flocks or 64%) did not react to the line (Morkill 1991). In the 1,112 flocks that did react, 77% increased altitude, 18% changed flight direction, and 5% flared.

Cranes were apparently aware of the marked lines much sooner when approaching the transmission line during flight. Cranes were more likely to increase altitude at 82 feet away from the line when it was marked, and flared more often within 16 feet of unmarked spans. Cranes flying short distances between feeding and resting areas flew at low altitudes 33-49 feet above the ground. This increased the risk of collisions with the conductors located 40 feet above the ground. These birds were likely to incur increased mortalities with power lines during periods of strong wind, particularly tailwinds and during fog and snowstorms. As in other similar studies, juvenile mortalities were greater than adults.

Juveniles may lack flight experience and familiarity with the area. Disturbances caused by roads and farm equipment is a leading cause of crane mortalities when found in proximity to power lines. Cranes will often "panic flush" when disturbed. These frightened birds will fly over, under and sometimes into power lines.

Yellow (12 inch diameter) aviation marker balls placed on the shield wires reduced crane collisions by 54%. Of the 36 carcasses recovered; 11 were beneath marked spans and 25 were beneath unmarked spans.

Brown and Drewien (1993) studied the effectiveness of two marking devices; yellow spiral vibration dampers (SVD's) and yellow swinging fiberglass plates. Over a three year period, the SVD's reduced crane mortalities by 61% and the plates 63%. The fiberglass plates caused powerline chaffing and are not recommended for further study or use. Sandhill cranes, geese and waterfowl were all observed to change altitude and reaction distance when approaching marked lines. Both of these investigations conclude that marking power lines is highly effective in reducing bird collisions in specific problem areas. However, they state that marking is neither necessary nor appropriate over large areas with low collision potential. A biologist should identify specific powerline spans to mark with BFD's after construction along; 1) preferred Route "A" or "B" near the South Fork Pit River crossing, 2) preferred Route "E," Sections 5 & 32, and sections 17 & 20 southwest of the town of Madeline, 3) preferred Route "E," Sections 5 & 32 west of Van Loan reservoir and 4)alternate Route "D," section 35 (south of Nelson Corral Reservoir). These areas contain sufficient numbers of birds and the potential for collision risk is greater than other areas along the routes.

ADDITIONAL STUDIES

Effort has been employed to route the transmission line away from major bird concentration areas. Dedicated waterfowl management areas, major wetlands, and significant riparian areas have been avoided along most of the preferred route. However, due to the extent of this intertie system, and numerous other routing constraints the potential for some bird collisions still exist along preferred as well as alternate routes.

To better understand the magnitude of the collision potential of special status species at identified high risk areas, additional studies are warranted. Bird species present, relative population numbers and flight movement patterns (particularly, altitude and direction) should be conducted during daylight and at night. Protocols for conducting these studies are beyond the scope of this report, but are found in many references. It is particularly important that a standardized study approach be designed similar to that recommended by the Avian Powerline Interaction Committee (APLIC 1994). The areas where additional studies should be conducted include;

1) South Fork of Pit River along preferred route "A" and alternate "B." The species of interest here include waterfowl, shorebirds, cranes and bald eagle.
2) North end of Madeline Plains where cranes, waterfowl and shorebirds may move east and west across preferred route "E."
3) Along preferred route "L" near Secret Valley where wetlands support cranes and waterfowl.
4) Along preferred route "O" near a peregrine falcon eyrie.
5) Along alternate route "Q" and preferred route "P" in Honey Lake Valley near Calneva and Duck Lakes.
6) Along alternate route "P" near Long Valley.

DISCUSSION

Review of the literature to date provided useful insight into the conditions that result in electrocution and collision risks to birds. Electrocution risks are not associated with large transmission line systems. The spacing of energized components is usually greater than the wingspan of our largest birds. In substations, bird electrocution incidents are infrequent and mitigation is available.

Previous investigators found that predictable species and environmental characteristics lead to increased bird collision risk. Careful route selection and transmission tower design and placement, as in this project can provide the most prudent, cost-effective means to reduce bird collision risks. Generally, large, heavy, less maneuverable species such as cranes, and pelicans are more vulnerable to collision risks than smaller, more agile birds. However, results of waterfowl mortality studies have been reported most often in the literature. Bird flight behavior plays a significant role in their susceptibility for collisions with powerlines. Fast flying birds chasing prey become preoccupied and they are vulnerable to collisions with man-made objects, including power lines. A variety of options prescribed in this project are available to mitigate for collisions when routing decisions and risk for bird collisions are unavoidable. Marking powerlines to make them more visible has reduced bird collisions significantly. This option has reduced the risk of collisions from 40% to 89% depending on the species, habitat conditions, and transmission system design.

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APPENDIX E.3

Community and Habitat Restoration Plan Objectives and General Guidelines

APPENDIX E.3
COMMUNITY AND HABITAT RESTORATION PLAN OBJECTIVES AND GENERAL GUIDELINES

The following document is intended to present objectives and general guidelines for the restoration of natural habitats disturbed by the Alturas Transmission Line Project, and will serve as the basis for the development of a detailed Community and Habitat Restoration Plan by Sierra Pacific Power Company (SPPCo, the Project Applicant). Proposed components of the restoration plan are outlined and discussed. The restoration plan will be provided to the permitting agencies 60 days prior to the initiation of construction.

1. INTRODUCTION

The restoration plan will be designed to mitigate environmental effects associated with the construction, operation, and maintenance of the Alturas Transmission Line, and, together with the other key elements of the detailed Mitigation Monitoring, Compliance, and Reporting Plan (e.g., Soil Conservation and Erosion Control Plan, Stream Crossings and Wetlands Protection Plan), will focus on restoration of the disturbed natural habitats. The restoration plan will be consistent with the requirements of BLM, CPUC, California Department of Fish and Game (CDFG), and other applicable agencies.

The primary purpose of this plan will be restoration of natural habitats to pre-construction conditions. Restoration procedures will utilize native plant species, with special attention to sensitive species habitats, edaphic conditions, erosion control, and wildlife habitat values. The restoration plan will address revegetation of all natural communities affected by the Proposed Project, including 10 major plant communities, 5 associated sub-communities, and 5 unique plant habitats (which include the Special Status Species that would be affected by the Project) described in the EIR/S.

The plan will develop appropriate revegetation methods developed for the various combinations of habitat, terrain, land use, resource sensitivity, and other factors that occur along the transmission line, and will address site preparation, plant materials and selection, specific erosion control measures, and planting methods and dates. Revegetation methods appropriate to different site conditions will be described in detail, and the locations where each method will be applied will be identified in the field and mapped on appropriate field maps. Where applicable, and in order to avoid the duplication of effort, the restoration plan should follow the techniques and methodology developed and implemented for the Tuscarora Gas Transmission Line Project Reclamation Plan (Tuscarora Gas Transmission Company, November 11, 1994, and subsequent revisions and associated documentation).

Criteria will be developed for evaluating impacts caused by overland travel after construction, in order to determine the appropriate level of restoration efforts for the affected area. Methods will also be discussed for resolving and prioritizing potential conflicts between revegetation goals and wildlife habitat needs at specific locations (for example, the need for erosion control measures that may disturb sensitive

species habitat). The plan will not address revegetation of human-influenced habitats such as agricultural land, residential, or industrial areas, or areas that have been significantly degraded and are dominated by non-native species.

Revegetation methods applicable to riparian scrub and wetland areas will be included. No crossings of perennial drainages are proposed; for Crooks Canyon or if any other crossings become necessary, specific plans for individual crossings will be developed separately during the preparation of CDFG stream crossing agreements and/or Army Corps of Engineers Section 404 permit applications (if required).

2. HABITAT AND ENVIRONMENTAL CONDITIONS

2.1 Habitat Descriptions

The restoration plan will include a brief description of each of the natural communities affected by the Proposed Project, including the 10 major plant communities and 5 associated sub-communities (Yellow Pine Forest; Juniper Woodland, including Northern Juniper Woodland and Great Basin Juniper Woodland; Big Sagebrush Scrub; Low Sagebrush Scrub; Chenopod Scrub, including Greasewood, Winterfat, and Shadscale Scrubs; Silver Sagebrush Scrub; Riparian Willow Scrub; Montane Meadow; Rabbitbush Scrub; and Mud Flat) and 5 unique plant habitats (stabilized and partially stabilized sand dunes, Alturas volcanic gravels, volcanic vertisols, altered andesite, and white ash deposits). The habitat descriptions will include species composition, general cover characteristics, species diversity, and edaphic/hydrologic characteristics.

A milepost table will be prepared describing where each of these habitat types occurs along the transmission line route. This table will also be used to identify locations for the implementation of the different revegetation strategies.

2.2 Environmental Considerations

In order to aid the success of the revegetation effort, the following environmental considerations will be taken into account during the development of the plan: habitat type and sensitivity, edaphic conditions, slope and erosion hazard, threatened or endangered species occurrence, government agency land ownership or jurisdiction, streams and other wetlands, timing, and extent of construction disturbance.

3. REVEGETATION PROGRAM

3.1 Introduction

The restoration program for the Alturas Transmission Line Project will contain guidelines for site preparation, including clearing, grading and soil replacement, erosion control, seedbed preparation,

planting, maintenance, and monitoring. Specific guidelines, including species lists, planting densities, and planting methodologies, will be included for each individual plant community, sub-community, and unique plant habitat disturbed by the project.

Minimization of surface disturbance caused by blading of overland travel routes, construction pads for structures, and clearing for substations will be emphasized to help ensure the successful recovery of the habitats.

3.2 Site Preparation

Site preparation will include methodologies for clearing, grading and/or re-grading of the areas to be reclaimed, topsoil salvage and replacement, and dicing or ripping to reduce soil compaction in construction areas, storage areas, and temporary access roads. Specific erosion control measures will also be discussed with appropriate reference to the Soil Conservation and Erosion Control Plan, including the use and placement of waterbars, retention devices, diversion structures, sediment barriers, and erosion control fabrics.

The detailed restoration plan will include the following specific site preparation techniques:

- Clearing of debris and/or non-native and invasive vegetation
- Grading/recontouring to natural conditions
- Topsoil salvage and replacement
- Erosion control measures.

3.3 Planting

Seeding will be the primary planting method for the restoration program. Specific seed mixes will be provided for each habitat type. These seed mixes will be developed from an analysis of existing dominant and successional stage plant species within the habitat types. All seed will be from locally collected native plant materials. Seeded areas will be mulched with native or naturalized hay or straw. The use of fertilizers and/or soil amendments should not be necessary, due to the limited disturbance of the ground surface and the likelihood of fertilizers to produce dense stands of annual grasses.

Specific planting guidelines addressed in the detailed reclamation plan will include:

- Species selection
- Plant material sources
- Seedbed preparation
- Seeding methods
- Planting schedule.

3.4 Habitat Revegetation Guidelines

Revegetation strategies will be prepared for the 10 major habitat types, 5 sub-communities, and 5 unique plant habitats identified in the EIR/S. Specifically, reclamation strategies will be proposed for the following habitat types:

Communities and sub-communities:

- Yellow Pine Forest
- Juniper Woodland
  - Northern Juniper Woodland
  - Great Basin Juniper Woodland
- Big Sagebrush Scrub
- Low Sagebrush Scrub
- Chenopod Scrub
  - Greasewood Scrub
  - Winterfat Scrub
  - Shadscale Scrub
- Silver Sagebrush Scrub
- Riparian Willow Scrub
- Montane meadow
- Rabbitbush scrub
- Mud Flat.

Unique plant habitats:

- Stabilized and partially stabilized sand dunes
- Alturas volcanic gravels
- Volcanic vertisols
- Altered andesite
- White ash deposits.

These revegetation strategies will include applicable site preparation guidelines, planting methods, species and planting densities, and maintenance and monitoring guidelines. Methods applicable to site-specific conditions such as steep slopes, rare plant habitat, or disturbance from overland travel, will also be included. The revegetation plan will include a summary of agency consultation, summary of site conditions, description of specific methods, identification by milepost where the methods will be applied, and references.

Revegetation strategies for each habitat type would include the following information:

- Site preparation
- Planting methodology
- Species list and planting densities
- Plans for seed salvage and storage
- Planting schedule
- Methodology applicable to special site conditions (e.g., steep slopes, rare plant habitat, high erosion potential)
- Methodology applicable to biology and ecology of special-status plants (i.e., propagation techniques, seed collection schedule, special soil conditions).

4. IMPLEMENTATION

The restoration program will be an integral part of the construction process, and will be the last step in construction. Revegetation procedures and requirements will be identified in the construction contract and construction documents. Environmental monitors and revegetation specialists will be onsite during restoration efforts to supervise and inspect the process.

The implementation section of the detailed restoration plan will include the following topics:

- Construction schedule
- Construction documents
- Supervision and inspection.

5. MAINTENANCE AND MONITORING

The restoration plan will contain a detailed maintenance and implementation assurance program, including specific quantitative performance criteria and inspection and measurement guidelines for each one of the natural communities being restored.

Follow-up inspections of the revegetated areas will be conducted after the first and second growing seasons to determine the success of the revegetation effort. Revegetation will be considered successful if the intended non-nuisance vegetation is similar in density and species composition to adjacent undisturbed lands, based on representative visual surveys and random sampling in the field. Permanent reference locations will be established for comparison of undisturbed and revegetated areas.

Maintenance procedures, including weed control, erosion control, reseeding, and other remedial actions, will be included.

Annual performance criteria will be established for each habitat type; if these criteria are not attained, as judged by the overseeing agencies, within each established time period, remedial measures will be developed. The two primary performance criteria will be:

- Annual percent coverage by planted species
- Expected survival rates of planted species.

The annual performance criteria will be used in the implementation assurance program, to be coordinated with the agencies' mitigation monitoring program, to provide for the necessary SPPCo supervision, inspection, and measurement that will be required to assure proper implementation of the restoration plan and its best chances for success.

Contingency plans will be established to compensate for partial success or complete failure. Offsite compensation requirements will be triggered if remedial measures are not likely to bring the revegetated areas into conformance per the judgement of the overseeing agencies. If BLM, CPUC, or CDFG determine that revegetation has not met the established performance criteria, exact offsite compensation requirements will be specified. Monitoring will be discontinued if the revegetation efforts are deemed unsatisfactory and offsite compensation is specified by agency personnel.

The detailed restoration plan will include the following maintenance guidelines:

- Reseeding/remedial measures
- Weed and pest management
- Grazing control
- Fencing.

The implementation assurance section will include the following information:

- Inspection methodology
- Methods of data collection, analysis, and presentation
- Inspector qualifications
- Specific population locations to be inspected and monitored
- Permanent off-site reference plots to be inspected and monitored
- Inspection schedule (to be coordinated with agency mitigation monitoring program)
- Annual performance criteria
- Final performance criteria
- Reporting
- Remediation measures for unsuccessful revegetation
- Contingency plans for partial success or complete failure.

APPENDIX E.4

No Structure Zones for Biological Resources

Table E-4 No Structure Zones for Biological Resources

From/To (AP-AP)	Resource ID	# of Structures within Boundary	Overland Travel (feet)	Beginning Station Of Resource	Ending Station Of Resource	Recommended Buffer Amount	Northing of GPS Centerpoint	Easting of GPS Centerpoint
A1-A2	NONE							
A2-SUB	NONE							
SUB-ANP1	NONE							
ANP1-ANP2	NONE							
ANP2-A3	NONE							
A3-A4	NONE							
A4-A5	WET1	2	1700					
A5-B8	NONE							
B1-B2	NONE							
B2-B3	NONE							
B3-B4	NONE							
B4-B5	NONE							
B5-B6	NONE							
B6-B7	NONE							
B7-B8	WET2	1	700					
B8-A6	S1	1	0					
A6-C1	S15/9/8	0	0	14200	14840	200	4586410	699600
	WET3	0	0	2440	2600	200		
	S13	0	0	1460	1540	100	4590151	700446
	S12	0	0	1110	1180	100	4590290	700810
C1-C2	S19	1	0					
	S21/18	0	0	2600	3600	200	4585285	699780
	S20	1	0					

From/To (AP-AP)	Resource ID	# of Structures within Boundary	Overland Travel (feet)	Beginning Station Of Resource	Ending Station Of Resource	Recommended Buffer Amount	Northing of GPS Centerpoint	Easting of GPS Centerpoint
C2-C3	8IO12	6	5400					
C3-C4	S23	1	400					
	S22	1	200					
	R1	0	0					
	S165	0	0	USE 8UFFER AS RADIUS		2640	4576450.3	701820.5
C4-C5	8IO24	0	0	8505	8880	200	4567830	701800
	8IO21	0	0	1540	1980	200	4570100	700850
	BIO23	1	0					
C5-C6	S29	2	2500					
	R2	0	0					
	S28	2	2000					
C6-C7	NONE							
	FLAG-WET7/8							
C7-C8	S32	0	0	3325	3465	200	4559750	706440
	S33	0	0	4180	4490	200	4559480	706550
C8-C9	S36/R8	0	0	4400	5400	200	4557097	707735
C9-C10	S39/WET9/R8	0	0	2320	2770	200	4556065	708290
	S40	0	0	2965	3005	200	4555925	708323
	S42	0	0	3540	3615	200	4555820	708445
	S43	0	0	3830	3865	100	4555748	708515
	S37	0	0	800	820	100	4556515	708000
C10-D01	S81	0	0	6940	6950	150	4553647.9	707422.4
	8IO29	0	0	12200	13600	100	4552350	706200
D1-D2	NONE							
D2-D3	S44/47/48	0	0	6000	6380	100	4550095	703750
	S45	0	500	3480	4300	100	4550095	703765
	S46/49	0	0	5500	5645	100	4550095	703030
	S46A&B	0	0	2640	3180	100	4550070	703765
D3-D4	S50/82	0	0	2700	3320	100	4549150	702280
	S53	0	0	3930	4000	100	4548870	702295

From/To (AP-AP)	Resource ID	# of Structures within Boundary	Overland Travel (feet)	Beginning Station Of Resource	Ending Station Of Resource	Recommended Buffer Amount	Northing of GPS Centerpoint	Easting of GPS Centerpoint
	S55	1	0					
	WET11	0	0	4800	5400	150	4548375	702300
	S56/59	0	0	6755	7450	100	4547850	702365
	S57/60	0	0	8060	8240	100	4547640	702350
	S58/61	0	0	9580	9850	100	4547015	702350
	S62	0	0	11070	11550	100	4546650	702325
	S63	0	200	12370	12520	100	4546285	702370
	S64	0	700	12660	13350	100	4546100	702370
	S65	1	100					
D4-D5	S69	1	100					
D5-D7	S70	0	0	2785	2795	100	4544180	701610
D7-D8	S73	0	0	6400	6600	50	4541880	702510
	WET12	0	0	7400	8200	100	4541670	702620
	S76	1	0					
	S77	1						
D8-G1	NONE							
G1-G2	NONE							
G2-G3	NONE							
G3-G4	NONE							
G4-G5	NONE							
G5-G6	NONE							
G6-F4	S88	1	0					
F4-F3	S88	5	0					
	S87	0	0	10225	10235	100	4529075	706260
	S86/S89	4	0					
F2-F3	NONE							
F1-F2	NONE							
D8-F1	S85	1	0					

From/To (AP-AP)	Resource ID	# of Structures within Boundary	Overland Travel (feet)	Beginning Station Of Resource	Ending Station Of Resource	Recommended Buffer Amount	Northing of GPS Centerpolnt	Easting of GPS Centerpoint
C10-E1	NONE							
E1-E2	8IO38	0	0	12600	12840	100	4550400	710670
	BIO33	0	0	14355	14600	100	4549800	710740
E2-E3	SG8ROOD7		14300					
	BIO42	0	0	432	810	100	4549489	710807
	BIO41	0	0	3550	3665	100	4548560	710788
E3-E4	RANGES ??							
E4-E5	DEER2		13420					
	SG8ROOD7		11500					
	ANT2		13420					
E5-E6	DEER2		3060					
	ANT2		1700					
E6-E7	DEER2		10600					
E7-E8	8IO47	5	TUSC.					
	DEER2		600					
J1-J2	S88	0	0	J1 (0+00)	600	100	4529050	707440
	BIO51	●	5000					
J2-J3	BIO51	0	500	2600	3400	100	4526500	708300
	BIO51	●	500					
J3-J4	BIO56	●	2300					
J4-J5	S94	0	0	6700	6900	100	4519560	710108
J5-J6	NONE							
J6-J7	NONE							
J7-J8	S95	0	800	3760	4700	200	4510040	719765
	S96	0	0	6600	6800	200	4509675	720425
	8IO60	0	0	18000	18600	200	4508900	721950

From/To (AP-AP)	Resource ID	# of Structures within Boundary	Overland Travel (feet)	Beginning Station Of Resource	Ending Station Of Resource	Recommended Buffer Amount	Northing of GPS Centerpoint	Easting of GPS Centerpoint
J1-I1	S90	11	10500					
I1-E8	BIO47	1	0					
E8-K1	8IO47	4	3400					
K1-K2	S92	0	0	4302	4312	100	4527430	713830
	S91	0	0	1360	1510	100	4528073	713230
K2-K3	STREAM13	?	?					
	8IO52	4	TUSC.					
	S92SOFK2	0	0					
K3-K4	NONE							
K4-K5	NONE							
K5-K6	S163	0	0	USE 8UFFER AS RADIUS		2640	4518315.5	721538.7
J8-K6	BIO58	6	6200					
J8-L1	S105	0	0	16400	16600	100	4505853	726660
	S102	0	1000	12700	13200	100	4506475	725747
	S103	0	0	14560	14740	100	4506148	726175
L1-L2	S113	0	0	3865	4044	100	4504205	730290
	S111	0	0	1140	1520	200	4504265	729498
	S110	0	0	600	780	100	4504248	729325
	S112	0	0	2500	2660	100	4504202	729890
LN20-L03	S117	0	0	3600	3900	100	4502248	732442
	S118	0	0	3320	3500	100	4502160	732550
	DEER6/10		6200					
	R4	0	0					
L2-LN20	S116	0	0	3160	3260	150	4503452	731485
	S115	0	0	1560	1720	150	4503780	731125
	DEER6/10		5000					
L3-L4	S121	0	0	6500	6750	150	4499745	733765
	S120	0	0	2200	2460	100	4501000	733250
	DEER8	10	9200					

From/To (AP-AP)	Resource ID	# of Structures within Boundary	Overland Travel (feet)	Beginning Station Of Resource	Ending Station Of Resource	Recommended Buffer Amount	Northing of GPS Centerpoint	Easting of GPS Centerpoint
L4-L5	S125/S126	0	0	9070	10124	100	4496250	733240
	S124/123	0	0	7736	8535	100	4496675	733275
	S125	1	500					
	S122	0	0	6500	6700	100	4497120	733418
	DEER8/9	10	MINIMAL-ROAD					
L5-L6	S130	0	0	5434	5620	100	4494301	732740
	S129	0	0	4784	4880	100	4494473	732810
	S127/S128	3	2500					
	DEER9	5	4000					
L6-L7	WET16	7	7500					
	S138	0	0	21910	22100	100	4485736	731485
	S137	1	1200					
	S144	0	0	16640	16880	100	4487320	731615
	S136	0	0	15075	15255	100	4487810	731765
	S131/S132	0	0	1075	1525	200	4491980	732340
	S133/S134	0	0	1900	2160	100	4491723	733299
L7-LN09	S141	0	0	9292	9534	100	4480660	731660
	S139	0	0	4384	4647	100	4482138	731380
	ANTKID4	2	1500					
	WET16	3	2500					
LN09-L8	S142	4	4000					
L8-M1	S146	8	200	2200	2800	100	4475040	733000
	S147	8	0	3165	3205	100	4474821	733080
M1-M2	NONE							
M2-M3	NONE							
L8-N1	S145	0	0	593	650	150	4475647	733010
N1-N2	NONE							
N2-M3	NONE							
M3-O1	NONE							

From/To (AP-AP)	Resource ID	# of Structures within Boundary	Overland Travel (feet)	Beginning Station Of Resource	Ending Station Of Resource	Recommended Buffer Amount	Northing of GPS Centerpoint	Easting of GPS Centerpoint
O1-O2	S149	0	0	4650	5160	200	4468912	737950
O2-O3	NONE							
O3-O4	NONE							
O4-O5	NONE							
O5-P1	FA6							
	S157	0	0	18100	18300	150	4445012	749268
	S155	1	700					
	S156	1	1500					
P1-P2	NONE							
P2-P3	NONE							
P3-P4	NONE							
P4-P5	NONE							
P5-P6	FA1							
P6-P7	NONE							
P7-P8	NONE							
P8-P9	NONE							
O5-Q1	S153	●	MINOR					
	FA1							
	S151	0	200	9724	9949	100	4448150	751020
	S152	0	400	8760	9642	100	4448296	750872
Q1-Q2	S154	0	0	8100	8275	100	4440175	2460147
Q2-Q3	NONE							
Q3-Q4	NONE							
Q4-Q5	NONE							

From/To (AP-AP)	Resource ID	# of Structures within Boundary	Overland Travel (feet)	Beginning Station Of Resource	Ending Station Of Resource	Recommended Buffer Amount	Northing of GPS Centerpoint	Easting of GPS Centerpoint
Q5-P9	A1310	1	0					
	A1602	1	1					
	A1206	1	1					
	A1207	4	3800					
P9-R1	NONE							
R2-R1	NONE							
T2-WN01	NONE							
T1-T2	NONE							
R2-T1	R5	0	0					
R2-S01	R5	0	0					
S01-S02	R5	0	0					
S02-SN01	R6	0	0					
SN01-WN01	NONE							
WN01-W1	NONE							
W1-W2	NONE							
W2-WN04	NONE							
W1-WN02	NONE							
WN02-WN03	NONE							
WN03-WN04	NONE							
WN04-WN05	NONE							
V5-NSUB	NONE							
W3-V5	NONE							

From/To (AP-AP)	Resource ID	# of Structures within Boundary	Overland Travel (feet)	Beginning Station Of Resource	Ending Station Of Resource	Recommended Buffer Amount	Northing of GPS Centerpoint	Easting of GPS Centerpoint
WN05-W3	NONE							
WN05-WN06	NONE							
WN06-WN07	NONE							
WN07-WN08	NONE							
WN08-WN09	NONE							
WN09-WN10	NONE							
X1-WN10	NONE							
X1-X2	NONE							
X2-X3	NONE							
X3-X4	NONE							
X4-X5	NONE							
X5-X6	NONE							
X6-X7	NONE							
X7-X8	R8	0	0					
X8-X9	R9	0	0					
X10-X11	NONE							
X9-X10	S160	0	0	800	1050	200	4385749	254245
X9-Y1	S160	0	0	650	1100	200	4385749	254245
	S161	0	0					
	S162	0	0	4900	5050	200	4384212	254800
Y1-X12	NONE							
X11-X12	NONE							

From/To (AP-AP)	Resource ID	# of Structures within Boundary	Overland Travel (feet)	Beginning Station Of Resource	Ending Station Of Resource	Recommended Buffer Amount	Northing of GPS Centerpoint	Easting of GPS Centerpoint
X12-X13	NONE							
X13-X14	NONE							

Appendix F
Geology & Soils

VOLUME II

APPENDIX F
GEOLOGY AND SOILS

APPENDIX F SOILS TABLES

Table F-1 Modoc County Soil Characteristics
Table F-2 Lassen & Sierra Counties - Soil Characteristics
Table F-3 Washoe County Soil Characteristics
Table F-4 Soil Data Availability

Table F-1 Modoc County Soil Characteristics

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
Alturas 103	0-17 17-42 42-60	Loam **(3w-6)** Clay loam, clay Gravelly loam	CL, CL-ML CL GC, GM-GC	Low High Low	High High High	Low Low Low	0.43 0.32 0.37	5	2.5-5.0	Dec-Jun	>60	-
Balman 104	0-24 24-60	Loam **(3w-6)** Loam, sandy loam	CL, ML, CL-ML CL-ML, ML	Low Low	High High	High Moderate	0.32 0.32	5	4.0-6.0	Jan-Dec	>60	-
Bieber 109	0-6 6-18 18	Gravelly loam **(6e-1)** Clay, clay loam Indurated	SM-SC, GM-GC CH	Low High	Moderate High	Low Low	0.24 0.24	1	>6.0	-	>60 Cemented 80-20	Rippable
Casuse 118	0-2 2-12 12	Sandy loam **(6e-1)** Clay loam, sandy clay loam Unweathered bedrock	SM ML, CL	Low Moderate	Moderate Moderate	Moderate Low	0.24 0.32	1	>6.0	-	8-20	Hard
Delma 127	0-9 9-14 14	Loam **(7e-1)** Clay Weathered bedrock	CL-ML, CL CH	Moderate High	Moderate High	Low Low	0.24 0.24	1	>6.0	-	8-20	Rippable
Delma 128, 129	0-13 13-18 18	Cobbly loam **(6e-1)** Clay Weathered bedrock.	CL-ML, CL CH	Moderate High	Moderate High	Low Low	0.24 0.24	1	>6.0	-	8-20	Rippable
Deven 130	0-2 2-16 16	Clay loam **(6e-1)** Clay loam, clay Unweathered bedrock	ML, CL CL, CH	Moderate High	Moderate High	Low Low	0.24 0.24	1	>6.0	-	16-20	Hard
Deven 131, 132 132 (No estimates for Rock outcrop part.)	0-2 2-16 16	Very stony clay loam **(7s-1)** Clay, clay loam Unweathered bedrock	CL CL, CH	Moderate High	Moderate High	Low Low	0.24 0.28	1	>6.0	-	16-20	Hard
Gravel pits 143 Not rated		**(8s-1)**										
Karcal 146	0-6 6-21 21	Very cobbly clay **(6s-1)** Clay, silty clay Unweathered bedrock	GC, CL CL, CH	High High	High High	Low Low	0.28 0.28	2	<6.0	-	20-30	Hard
Karcal 147	0-6 6-21 21	Cobbly clay **(6s-1)** Clay, silty clay Unweathered bedrock	GC, CL CL, CH	High High	High High	Low Low	0.28 0.28	2	>6.0	-	20-30	Hard
Ladd 150, 151	0-12 12-40 40-60	Sandy loam **(4e-1)** Clay loam, loam Sandy loam, loam	SM-SC CL SM, ML	Low Moderate Moderate	Moderate Moderate Moderate	Low Low Low	0.32 0.28 0.32	5	>6.0	-	>60	-

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
Lakeview 152	0-31 31-60	Loam (3c-1) Sandy clay loam, loam	CL-ML, ML SC, CL	Low Moderate	High High	Low Low	0.24 0.28	5	4.0-5.0	Mar-Jul	>60	-
161 Lorella variant	0-10 10-40 40	Very stony loam (7e-1) Very cobbly clay loam Unweathered bedrock	CL-ML, CL CL, ML	Low Moderate	Moderate High	Low Low	0.32 0.32	2	>6.0	-	30-40	Hard
Pit 176	0-24 24-60	Silty clay loam (3w-5) Silt loam, clay loam, clay loam	CH, MH ML, MH, CL	High Moderate	High High	Low Low	0.24 0.28	5	3.0-4.0	Dec-Jul	>60	-
Tuff outcrop 193, 194 (Tuff outcrop part not rated.)		(7s-1)										

Table F-2 Lassen & Sierra Counties - Soil Characteristics

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
Cleghorn 116	0-7	Sandy loam (6e)	SM, SC, SC	Low	High	Low	.32	5	>6.0	-	>60	-
	7-19	Clay loam, sandy clay loam	SC, CL	Moderate			.32					
	19-34	Sandy loam, loam	SM	Low			.32					
	34-60	Loam, fine sandy loam	ML, SM	Low			.37					
Tunnison 118	0-1	Very cobbly clay (7s)	CH	High	High	Low	.10	2	>6.0	-	30-40	Hard
	1-31	Clay	CH	High			.20					
	31-38	Weathered bedrock	-	-			-					
	38-42	Unweathered bedrock	-	-			-					
122		(7s)										
Tunnison	0-1	Very stony clay	CH	High	High	Low	.10	2	>6.0	-	12-20	Hard
	1-31	Clay	CH	High			.20					
	31-38	Weathered bedrock	-	-			-					
	38-42	Unweathered bedrock	-	-			-					
Devada	0-7	Extremely stony loam	GC, GM-GC, SC, SC-SM	Moderate	High	Low	.15	1	>6.0	-	20-40	Hard
	7-15	Gravelly clay, clay	CH, GC	High			.17					
	15-19	Unweathered bedrock	-	-			-					
125		(7e)										
Devada	0-7	Very cobbly loam	GC, GM-GC, SC, SC-SM	Moderate	Moderate		.15	1	>6.0	-	12-20	Hard
	7-15	Gravelly, clay, clay	CH, GC	High			.17					
	15-19	Unweathered bedrock	-	-			-					
Rock Outcrop	0-60	Unweathered bedrock	-	-	Low		-		>6.0	-	0-0	Hard
130		(7e)										
Devada	0-4	Very stony loam	SC-SM, SC, CL-ML, CL	Moderate	Moderate	Low	.17	1	>6.0	-	12-20	Hard
	4-13	Gravelly clay, clay	CH-GC	High			.17					
	13-17	Unweathered bedrock	-									
Fivesprings	0-3	Very stony loam	SC-SM, SM, CL-ML, ML	Low	High	Low	.15	2	>6.0	-	20-40	Hard
	3-8	Very gravelly clay loam	GC	Moderate			.15					
	8-23	Very gravelly clay, clay loam	GC	High			.10					
	23-27	Unweathered bedrock	-	-			-					
Rubble Land	0-60	Fragments	GP	Low	-	-	-		>6.0	-	40-40	Hard

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
Gerlach 135	0-3	Silty clay (6e)	CH	High	High	Low	.32	5	>6.0	-	>60	-
	3-44	Silty clay, clay	CH	High			.32					
	44-60	Silty clay, clay, clay loam	CL, CH	High			.32					
147		(7s)										
Easte	0-13	Gravelly loam	GM	Low	Moderate	Moderate	.20	3	>6.0	-	40-60	Soft
	13-58	Extremely gravelly loam, very gravelly loam	GP-GM, GM	Low			.10					
	58-62	Weathered bedrock	-	-			-					
Fredonyer	0-4	Very stony loam	GM, SM, GM-GC, SC-SM	Low	Moderate	Low	.15	2	>6.0	-	20-40	Hard
	4-12	Gravelly loam	GM, GM-GC	Low			.15					
	12-28	Very cobbly loam	GM, GM-GC	Low			.15					
	28-32	Unweathered bedrock	-	-			-					
152		(6w)										
Gerlach	0-3	Silty clay	CH	High	High	Low	.32	5	>6.0	-	>60	-
	3-44	Silty clay, clay	CH	High			.32					
	44-60	Silty clay, clay, clay loam	CL, CH	High			.32					
Ravendale	0-16	Silty clay	CH	High	High	Low	.24	5	>6.0	-	>60	-
	16-48	Clay, silty clay	CH	High			.28					
	48-60	Clay, silty clay, clay loam	CH	High			.24					
157		(7s)										
Buckbay	0-11	Gravelly loam	GM, SM	Low	Moderate	Low	.24	2	>6.0	-	20-40	Soft
	11-19	Gravelly loam, gravelly clay loam	GC, GM-GC, CL-ML, CL	Moderate			.24					
	19-29	Cobbly loam, cobbly clay loam	SC, SC-SM, CL-ML, CL	Moderate			.24					
	29-33	Weathered bedrock	-	-			-					
Orhood	0-4	Very stony loam	GM, SM	Low	Moderate	Low	.10	1	>6.0	-	14-20	Hard
	4-9	Very cobbly loam	GM-GC, GC, SC-SM, SC	Low			.10					
	9-19	Very cobbly loam, very stony clay loam	GM-GC, GC	Low			.10					
	19-23	Unweathered bedrock	-	-			-					
Fredonyer	0-4	Very stony loam	GM, SM, GM-GC, SC-SM	Low	Moderate	Low	.15	2	>6.0	-	20-40	Hard
	4-12	Very gravelly loam	GM, GM-GC	Low			.15					
	12-28	Very cobbly loam	GM, GM-GC	Low			.15					
	28-32	Unweathered bedrock	-	-			-					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
159		(7s)										
Devada	0-7	Very stony loam	SC-SM, SC, CL-ML, CL	Moderate	Moderate	Low	.17	1	>6.0	-	12-20	Hard
	7-15	Gravelly clay, clay	CH,GC	High			.17					
	15-19	Unweathered bedrock	-	-			-					
Petescreek	0-10	Gravelly loam	GM-GC, SC-SM, SM, GM	Low	Moderate	Low	.24	2			20-40	Soft
	10-27	Gravelly loam, cobbly loam	SC-SM, SM	Low			.24					
	27-31	Weathered bedrock	-	-			-					
Fiddler	0-8	Very stony loam	CL-ML, ML, CL	Low	High	Low	.20	2	>6.0	-	20-40	Hard
	8-23	Very stony clay loam, very cobbly clay	CL, CH	Moderate		Moderate	.10					
	23-27	Unweathered bedrock	-	-		-	-					
166		(7s)										
Devada	0-7	Very stony loam	SC-SM, SC, CL-ML, CL	Moderate	Moderate	Low	.17	1	>6.0	-	12-20	Hard
	7-15	Gravelly clay, clay	CH, GC	High			.17					
	15-19	Unweathered bedrock	-	-			-					
Orhood	0-4	Very stony loam	GM, SM	Low	Moderate	Low	.10	1	>6.0	-	14-20	Hard
	4-9	Very cobbly loam	GM-GC, GC, SC-SM, SC	Low			.10					
	9-19	Very cobbly loam, very stony clay loam	GM-GC, GC	Low			.10					
	19-23	Unweathered bedrock	-	-			-					
Hart Camp	0-4	Stony loam Gravelly loam, gravelly sandy clay loam	ML	Low	Moderate	Low	.20	1	>6.0	-	10-20	Soft
	4-16	Weathered bedrock	SC	Moderate			.24					
	16-20		-	-			-					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
169		(7e)										
Fredonyer	0-4	Very stony loam	GM, SM, GM-GC, SC-SM	Low	Moderate	Low	.15	2	>6.0	-	20-40	Hard
	4-12	Very gravelly loam	GM, GM-GC	Low			.15					
	12-28	Very cobbly loam	GM, GM-GC	Low			.15					
	28	Unweathered bedrock	-	-			-					
Whitinger	0-6	Very stony loam	GM-GC, GM, SC-SM, SM	Low	Moderate	Low	.10	2	>6.0	-	20-40	Hard
	6-26	Very cobbly and very stony clay loam	GC, SC	Low			.10					
	26-30	Unweathered bedrock	-	-			-					
Orhood	0-4	Very stony loam	GM, SM	Low	Moderate	Low	.10	1	>6.0	-	14-20	Hard
	4-9	Very cobbly loam	GM-GC, GC, SC-SM, SC	Low			.10					
	9-19	Very cobbly loam, very stony clay loam	GM-GC, GC	Low			.10					
	19-23	Unweathered bedrock	-	-			-					
177		(7s)										
Horsecamp	0-2	Very cobbly silty clay	CH	High	High	Low	.10	3	>6.0	-	40-60	Hard
	2-40	Silty clay, clay	CH	High			.28					
	40-46	Silty clay, clay, clay loam	CH, CL	High			.28					
	46-50	Unweathered bedrock	-	-			-					
Brubeck	0-2	Very cobbly clay	CH	High	High	Low	.15	2	>6.0	-	20-40	Hard
	2-32	Silty clay, clay	CH	High			.28					
	32-36	Unweathered bedrock	-	-			-					
182		(7s)										
Fiddler	0-8	Very stony loam	CL-ML, ML	Low	High	Low	.20	2	>6.0	-	20-40	Hard
	8-23	Very stony and cobble clay loam, very stony clay	CL, CH	Moderate			.10					
	23-27	Unweathered bedrock	-	-			-					
Orhood	0-4	Very stony loam	GM, SM	Low	Moderate	Low	.10	1	>6.0	-	14-20	Hard
	4-9	Very cobbly loam	GM-GC, GC, SC	Low			.10					
	9-19	Very cobbly loam, Very cobbly clay loam, very stony clay loam	GM-GC, GC -	Low			.10					
	19-23	Unweathered bedrock	-	-			-					
Petescreek	0-10	Very gravelly loam	GM-GC, GM SC-SM, SM	Low	Moderate	Low	.17	2			20-40	Soft
	10-27	Gravelly loam, cobbly loam	-	Low			.24		>6.0	-		
	27-31	Unweathered bedrock	-	-			-					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
185		(7s)										
Longcreek	0-3	Very cobbly loam	SC-SM, SM, GM-GC, GM	Low	Moderate	Low	.17	1	>6.0	-	14-20	Hard
	3-7	Very cobbly clay loam	CL	Low			.17					
	7-18	Very cobbly clay, very cobbly silty clay	CL, CH	Moderate			.15					
	18-22	Unweathered bedrock	-				-					
Devada	0-4	Very cobbly loam	GC, GM-GC, SC, SC-SM	Moderate High	Moderate	Low	.15	1	>6.0	-	12-20	Hard
	4-13	Gravelly clay, clay	CH, GC	-			.17					
	13-17	Unweathered bedrock	-	Low	-		-					
Rubble Land	0-60	Fragments	GP			-	-	-	>6.0	-	0-40	Hard
186		(7e)										
Longcreek	0-3	Very cobbly loam	SC-SM, SM, GM-GC, GM	Low	Moderate	Low	.17	1	>6.0	-	14-20	Hard
	3-7	Very cobbly clay loam	CL	Low			.17					
	7-18	Very cobbly silty clay	CL, CH	Moderate			.15					
	18-22	Unweathered bedrock	-	-			-					
Devada	0-4	Very cobbly loam	GC, GM-GC, SC, SC-SM	Moderate	Moderate	Low	.15	1	>6.0	-	12-20	Hard
	4-13	Gravelly clay, clay	CH, GC	High			.17	-				
	13-17	Unweathered bedrock	-	-			-					
Rubble Land	0-60	Fragments	GP	Low	-	-	-		>6.0	-	40-40	Hard
Ravendale 205	0-16	Silty clay (6w)	CH	High	High	Low	.24	5	-	-	>60	-
	16-48	Clay, silty clay	CH	High			.28					
	48-60	Clay, silty clay	CL, CH	High			.24					
Ravendale 208	0-16	Clay, silty clay (6s)	CH	High	High	Low	.24	5	>6.0	-	>60	-
	16-48	Clay, silty clay, clay loam	CH	High			.28					
	48-60	Silty clay	CL, CH	High			.24					
Ravendale 210	0-16	Silty clay (4w-2)	CH	High	High	Low	.24	5	>6.0	-	>60	-
	16-48	Clay, silty clay	CH	High			.28					
	48-60	Clay, silty clay, clay loam	CL, CH	High			.24					
Ravendale 211	0-16	Silty clay (4s-2)	CH	High	High	Low	.24	5	>6.0	-		
	16-48	Clay, silty clay	CH	High			.28					
	48-60	Clay, silty clay, clay loam	CL, CH	High			.24					
Dry Valley 218	0-4	Silt loam (4s-3)	CL-ML, ML	Low	High	Low	.43	4	>6.0	-	>60	-
	4-20	Silty clay, clay	MH, CH	High			.32					
	20-42	Silty clay loam	CL	Moderate			.37					
	42-60	Stratified sandy loam to sand	SM	Low			.20					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
Pit 226	0-24	Clay (4w)	MH, CH	High	High	Low	.32	5	5.0-6.0	Dec-May	>60	-
	24-37	Silty clay loam, silty clay, clay	CL, CH	High			.37					
	37-60	Silty clay loam, clay loam	ML, CL	Moderate			.37					
Shinnpeak 229	0-2	Very Cobbly loam (7s)	GM-GC, GM, SM-SC, SM, SM	Low	Moderate	Low	.10	1	>6.0	-	>60	-
	2-13	Very gravelly sandy clay loam, gravelly clay loam	GC	Moderate			.10				Cemented 13-20	
	13-22	Indurated	-	-			-					
	22-60	Cemented	-	-			-					
Corral 266	0-4	Sandy loam (7e)	SM	Low	Moderate	Low	.28	1	>6.0	-	12-20	Soft
	4-12	Clay loam, loam, sandy clay loam	CL	Moderate			.32					
	12-16	Weathered bedrock	-	-			-					
Calpine 285	0-10	Fine sandy loam (2e-2)	SM	Low	High	Low	.28	4	>6.0	-	>60	-
	10-50	Sandy loam, loam	SM	Low			.32					
	50-62	Gravelly sand	SP-SM	Low			.17					
Yobe 290	0-4	Silty loam (7w)	ML	Low	High	Low	.49	5	3.0-5.0	Jan-Apr	>60	-
	4-60	Sandy, very fine sandy loam, silty clay loam	CL	Moderate			.43					
293		(7s)										
Petescreek	0-10	Gravelly loam	GM-GC, SC-SM, SM, GM	Low	Moderate	Low	.24	2	>6.0	-	20-40	Soft
	10-27	Gravelly loam, cobbly loam	SC-SM, SM	Low			.24					
	27-31	Weathered bedrock	-	-			-					
Fredonyer	0-4	Very stony loam	GM, SM, GM-GC, SC-SM	Low	Moderate	Low	.15	2	>6.0	-	20-40	Hard
	4-12	Gravelly loam	GM, GM-GC	Low			.15					
	12-28	Very cobbly loam	GM, GM-GC	Low			.15					
		Unweathered bedrock										
294		(7e)										
Petescreek	0-10	Gravelly loam	GM-GC, GM	Low	Moderate	Low	.17	2	>6.0	-	20-40	Soft
	10-27	Gravelly loam, cobbly loam	SC-SM, SM	Low			.24					
	27-31	Weathered bedrock	-	-			-					
Fredonyer	0-4	Very stony loam	GM, SM, GM-GC, SC-SM	Low	Moderate	Low	.15	2	>6.0	-	20-40	Hard
	4-12	Gravelly loam	GM, GM-GC	Low			.15					
	12-28	Very cobbly loam	GM, GM-GC	Low			.15					
	28-32	Unweathered bedrock	-	-			-					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
301		(7s)										
Petescreek	0-10	Gravelly loam	GM-GC, SC-SM, SM, GM	Low	Moderate	Low	.24	2	>6.0	-	20-40	Soft
	10-27	Gravelly loam, cobbly loam	SC-SM, SM	Low			.24					
	27-31	Weathered bedrock	-	-			-					
Dunnlake	0-7	Very stony loam	SC-SM, SC, CL-ML, CL	Moderate	Moderate	Low	.17	1	>6.0	-	12-20	Hard
	7-15	Gravelly clay, clay	GH, GC	High			.17					
	15-19	Unweathered bedrock	-	-			-					
Searles	0-13	Very stony loam	GM, ML, SM	Low	Moderate	Low	.15	2	>6.0	-	20-40	Hard
	13-29	Extremely gravelly clay loam, very cobbly clay loam	GC	Low			.10					
	29-33	Unweathered bedrock	-	-			-					
304		(7s)										
Petescreek	0-13	Gravelly loam	GM-GC, SC-SM, SM, GM	Low	Moderate	Low	.24	2	>6.0	-	20-40	Soft
	13-29	Gravelly loam, cobbly loam	SC-SM, SM	Low			.24					
	29-33	Weathered bedrock	-	-			-					
Searles	0-8	Very stony loam	GM, ML, SM	Low	Moderate	Low	.15	2	>6.0	-	20-40	Hard
	8-40	Extremely gravelly clay loam, very cobbly clay loam	GC	Low			.10					
	40-44	Unweathered bedrock	-	-			-					
Zorravista 310	0-4	Loamy sand (6s)	SM	Low	High	Low	.17	5	>6.0	-	>60	-
	4-60	Fine sand, sand, loamy fine sand	SP-SM, SM	Low			.17					
Zorravista 312	0-4	Sand (7s)	SP-SM, SM	Low	High	Low	.17	5	>6.0	-	>60	-
	4-60	Fine sand, sand, loamy fine sand	SP-SM, SM	Low			.17					
Incy 314	0-4	Fine sand (7s)	SP-SM, SM	Low	Moderate	Low	.10	5	>6.0	-	>60	-
	4-60	Fine sand, sand	SP-SM, SM	Low			.10					
Incy 314	0-4	Fine sand (7s)	SP-SM, SM	Low	Moderate	Low	.10	5	>6.0	-	>60	-
	4-60	Fine sand, sand	SP-SM, SM	Low			.10					
325		(7e)										
Epot	0-13	Very fine sandy loam	ML	Low	High	Low	.55	1	>6.0	-	>60	-
	13-26	Silty clay loam, clay loam	ML	Moderate			.55					
	26-48	Loam, silty loam, clay loam	CL-ML, ML	Low			.55					
	48-63	Stratified sand, fine sandy loam	SM	Low			.20					
Playas	0-6	Silty clay	CL, CH, MH	High	High	High	.37	5	>6.0	-	>60	-
	6-60	Silty clay loam, clay, silty clay	CL, CH, MH	High			.37					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
329		(7s)										
Calneva	0-6	Silty loam	CL-ML, ML	Low	High	High	.55	1	>6.0	-	>60	-
	6-16	Silty clay loam, silty clay	MH	High			.49					
	16-36	Loam, silty loam, clay loam	ML	Moderate			.55					
	36-72	Stratified silty clay loam, sand	ML	Low			.55					
Playas	0-6	Silty clay	CL, CH, MH	High	High	High	.37	5	>6.0	-	>60	-
	6-60	Silty clay loam, clay, silty clay	CL, CH, MH	High			.37					
Calneva 330	0-6	Silty loam (7s)	CL-ML, ML	Low	High	High	.55	1	>6.0	-	>60	-
	6-16	Silty clay loam, silty clay	MH	High			.49					
	16-36	Loam, silty loam, clay loam	ML	Moderate			.55					
	36-72	Stratified silty clay loam, sand	ML	Low			.55					
336		(7s)										
Wespac	0-10	Silty loam	ML, CL-ML	Low	High	Low	.49	1	>6.0	-	>60	-
	10-19	Clay loam, silty clay loam	CL	Moderate			.37					
	19-60	Loam	CL-ML, ML	Low			.49					
Playas	0-6	Silty clay	CL, CH, MH	High	High	High	.37	5	>6.0	-	>60	-
	6-60	Silty clay loam, clay, silty clay	CL, CH, MH	High			.37					
340		(7s)										
Highrock	0-5	Fine sandy loam	SM	Low	High	Moderate	.37	1	>6.0	-	>60	-
	5-14	Sandy clay loam, clay loam	CL, SC	Moderate			.32					
	14-30	Loam	ML, CL-ML	Low			.43					
	30-60	Stratified sand, loamy fine sand	SM	Low			.24					
Mazuma	0-5	Loamy fine sand	SM	Low	High	High	.37	5	>6.0	-	>60	-
	5-60	Stratified gravelly cobbly sand, silty loam	SM	Low			.24					
		Fine sandy loam										
Wespac	0-3	Sandy clay loam, clay loam, loam	CL, SC	Low	High	Low	.32	1	>6.0	-	>60	-
	3-30	Stratified sand, fine sand	SM	Moderate			.37					
	30-60		SM	Low			.20					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
341		(7s)										
Highrock	0-5	Loamy fine sand	SM	Low	High	Moderate	.37	1	>6.0	-	>60	-
	5-14	Sandy clay loam, clay loam	CL, SC	Moderate			.37					
	14-30	Loam	CL-ML, CL	Low			.43					
	30-60	Loam, clay loam, silty clay loam	CL, CL-ML	Low			.37					
Wespac	0-10	Fine sandy loam	SM	Low	High	Low	.37	1	>6.0	-	>60	-
	10-19	Clay loan, sandy clay loam	CL	Moderate			.37					
	19-60	Loam	CL-ML, ML	Low			.49					
Zorravista	0-4	Loamy sand	SM	Low	High	Low	.17	5	>6.0	-	>60	-
	4-60	Fine sand, sand, loamy fine sand	SP-SM, SM	Low			.17					
345		(7s)										
Epot	0-13	Loam	ML	Low	High	Low	.55		>6.0	-	>60	-
	13-26	Silty clay loam, clay loam	ML	Moderate			.55					
	26-48	Loam, silty loam, clay loam	CL-ML, ML	Low			.55					
	48-63	Stratified sand, fine sandy loam	SM	Low			.20					
Ragtown	0-4	Loam	ML, CL-ML	Low	High	High	.37		>6.0	-	>60	-
	4-60	Stratified silty clay loam, clay	CL, CH, MH	High			.32					
Playas	0-6	Silty clay	CL, CH, MH	High	High	High	.37		-	-	>60	-
	6-60	Silty clay loam, clay, silty clay	CL, CH, MH	High			.37					
Ardep 358	0-6	Fine sandy loam (2s-6)	SM	Low	High	Moderate	.37	1	>6.0	-	>60	-
	6-20	Loam, silty loam, fine sandy loam	SM, ML	Low			.37					
	20-60	Stratified fine sandy loam, sand	SM	low			.28					
Mazuma 360	0-7	Fine sandy loam (7s)	SM	Low	High	High	.28	5	>6.0	-	>60	-
	7-30	Sandy loam, fine sandy loam	SM	Low			.43					
	30-60	Stratified silty loam, gravelly cobbly sand	SM, ML	Low			.24					
Mazuma 361	0-5	Loamy fine sand (6s)	SM	Low	High	High	.37	5	>6.0	-	>60	-
	5-60	Stratified gravelly cobbly sand, silty loam	SM	Low			.24					
Ardep 365	0-5	Sandy loam (6s)	SM	Low	High	Low	.32	3	>6.0	-	>60	-
	5-34	Loam, fine sandy loam, sand	SM, ML	Low			.37					
	34-60	Stratified fine sandy loam, sand	SM	Low			.24					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
369		(7s)										
Ardep	0-5	Sandy loam	SM	Low	High	Low	.32	3	>6.0	-	>60	-
	5-36	Loam, sandy loam, fine sandy loam	SM, ML	Low			.37					
	36-60	Stratified fine sandy loam, sand	SM	Low			.24					
Wespac	0-5	Sand	SM	Low	High	Low	.28	1	>6.0	-	>60	-
	5-12	Clay loam, sandy clay loam	CL	Moderate			.37					
	12-60	Loam	CL-ML, ML	Low			.49					
Zorravista	0-4	Fine sand	SP-SM, SM	Low	High	Low	.17	5	>6.0	-	>60	-
	4-60	Fine sand, sand, fine sandy loam	SP-SM, SM	Low			.17					
370		(7s)										
Lieberman	0-12	Fine sandy loam	SM, SC-SM	Low	High	Moderate	.37	2	>6.0	-	>60	-
	12-20	Clay loam, loam, sandy clay loam	SC, CL	Moderate			.37					
	20-60	Stratified sand, fine sand	SP-SM, SM	Low			.20					
Herlong	0-3	Fine sandy loam	SC-SM, SM	Low	High	Low	.32	1	>6.0	-	>60	-
	3-9	Loam	CL-ML, ML	Low			.37					
	9-12	Indurated	-	-			-				Cemented 9-14	
Lieberman 372	0-12	Fine sandy loam (7s)	SM, SC-SM	Low	High	Moderate	.37	2	>6.0	-	>60	-
	12-20	Clay loam, loam, sandy clay loam	SC, CL	Moderate			.37					
	20-60	Stratified sand, fine sand	SP-SM, SM	Low			.20					
Herjun 376	0-10	Loamy sand (7s)	ML	Low	High	Low	.49	5	>6.0	-	>60	-
	10-32	Sloam, loam	SM	Low			.28					
	32-60	Loamy sand, loam	ML	Low			.55					
380		(7s)										
Cewat	0-4	Very stony fine sandy loam	SC-SM, GM-GC	Low	Moderate	Low	.17	2	>6.0	-	20-40	Hard
	4-21	Gravelly loam, extremely gravelly loam	SC-SM, SC,	Low			.10					
	21-25	Unweathered bedrock	GM-GC, GC	-			-					
McConnel	0-3	Gravelly, fine sandy loam Stratified gravelly, sandy loam, extremely	GM	Low	High	Moderate	.32	2	>6.0	-	>60	-
	3-60	gravelly cobbly sand	GP	Low			.02					
Toulon	0-3	Gravelly fine sandy loam Gravelly sandy loam, gravelly loam,	SM, GM	Low	High	Low	.28	5	>6.0	-	>60	-
	3-14	gravelly cobbly sandy loam	GM	Low			.20					
	14-60	Stratified gravelly cobbly sand, extremely cobbly sand	GP, GP-GM	Low			.10					
Bobert 384	0-6	Sandy loam (7s)	SM	Low	High	Low	.24	1	>6.0	-	>60	-
	6-14	Sandy clay loam	CL	Moderate			.43					
	14-60	Sandy loam, loam	SM, SC-SM	Low			.28					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
402		(7s)										
Searles	0-13	Very stony loam	GM, ML, SM	Low	Moderate	Low	.15	2	>6.0	-	20-40	Hard
	13-29	Extremely gravelly clay loam, extremely cobbly loam, very cobbly clay loam	GC	Low			.15					
	29-33	Unweathered bedrock	-	-			-					
Orhood		Very stony loam			Moderate							
	0-4	Very cobbly loam, very cobbly clay loam,	GM, SM	Low		Low	.10	1	>6.0	-	14-20	Hard
	4-19	very stony clay loam	GM-GC, GC	Low			.10					
	19-23	Unweathered bedrock	-	-	Moderate		-					
Dunlake		Very stony loam										
	0-7	Gravelly clay loam, clay	SC-SM, SC, CL-ML, CL	Moderate		Low	.17	1	>6.0	-	12-20	Hard
	7-15	Unweathered bedrock		High			.17					
	15-19		-	-			-					
413		(7s)										
Loomis	0-2	Very cobbly loam	GC, SC	Low	Moderate	Low	.10	1	>6.0	-	8-14	Hard
	2-6	Very cobbly clay loam, gravelly clay loam	GC	Moderate			.10					
	6-11	Very cobbly clay, gravelly clay	GC	Moderate			.05					
	11-15	Unweathered bedrock	-	-			-					
Five Springs	0-3	Very cobbly loam	SC-SM, SM, CL-ML, ML	Low	High	Low	.15	2	>6.0	-	20-40	Hard
	3-8	Gravelly clay loam	GC	Moderate			.15					
	8-23	Gravelly clay, gravelly clay loam	GC	High			.10					
	23-27	Unweathered bedrock	-	-			-					
421		(7e)										
Rubble Land	0-60	Fragments	GP	Low	-	-	-	-	>6.0	-	0-40	Hard
Longcreek	0-3	Very stony loam	SC-SM, SM, GM-GC, GM	Low	Moderate	Low	.17	1	>6.0	-	14-20	Hard
	3-7	Very cobbly clay loam	CL	Low			.17					
	7-18	Very cobbly clay, very cobbly silty clay	CL, CH	Moderate			.15					
	18-22	Unweathered bedrock	-	-			-					
Fivesprings		Very stony loam			High							
	0-3	Gravelly clay loam	SC-SM, SM, CL-ML, ML	Low		Low	.15	2	>6.0	-	20-40	Hard
	3-8	Gravelly clay, gravelly clay loam	GC	Moderate			.15					
	8-23	Unweathered bedrock	GC	High			.10					
	23-27		-	-			-					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
429		(7s)										
Rubble Land	0-60	Fragments	GP	Low	-	-	-	-	>6.0	-	0-40	Hard
Fiddler	0-8	Very stony loam	CL-ML, ML, CL	Low	High	Low	.20	20	>6.0	-	20-40	Hard
	8-23	Very stony clay loam, very stony clay, very cobbly clay loam	CL, CH	Moderate			.10	.10				
	23-27	Unweathered bedrock	-	-			-	-				
430		(7e)										
Pits	0-60	Variable	-	-	-	-	-	-	>6.0	-	>60	-
Dumps	0-60	Variable	-	-	-	-	-		>6.0	-	>60	-
445		(7s)										
Brubeck	0-2	Very cobbly clay	CH	High	High	Low	.18	2	>6.0	-	20-40	Hard
	2-32	Silty clay, clay	CH	High			.28					
	32-36	Unweathered bedrock	-	-			-					
Diaz	0-3	Very cobbly silty loam	CL-ML, ML	Low	High	Low	.17	2	>6.0	-	20-40	Hard
	3-7	Silty clay loam	CL	Moderate			.37					
	7-25	Silty clay, clay	CH	High			.24					
	25-29	Unweathered bedrock	-	-			-					
464		(7s)										
Searles	0-13	Very stony loam	GM, ML-SM	Low	Moderate	Low	.15	2	>6.0	-	20-40	Hard
	13-29	Extremely gravelly clay loam, extremely cobbly loam, very cobbly clay loam	GC	Low			.10					
	29-33	Unweathered bedrock	-	-			-					
Glean		Gravelly sandy loam										
	0-14	Very gravelly sandy loam, very gravelly loam	SM, GM	Low	Moderate	Low	.15	3	>6.0	-	40-60	Hard
	14-44		GM	Low			.10					
	44-48	Unweathered bedrock	-	-			-					
Calpine 477	0-24	Sandy loam (2e-1)	SM	Low	Moderate	Moderate	.32	5	>6.0	-	>60	-
	24-60	Sandy loam, cobbly sandy loam	SM	Low			.20					
Calpine 477	0-24	Sandy loam (2e-1)	SM	Low	Moderate	Moderate	.32	5	>6.0	-	>60	-
	24-60	Sandy loam, cobbly sandy loam	SM	Low			.20					
Calpine 479	0-24	Sandy loam (4e)	SM	Low	Moderate	Moderate	.32	5	>6.0	-	>60	-
	24-60	Sandy loam, cobbly sandy loam	SM	Low			.20					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
495		(7s)										
Searles	0-13	Gravelly loam	CL-ML, GM-GC, GC, SC	Low	Moderate	Low	32	2	>6.0	-	20-40	Hard
	13-29	Very gravelly sandy clay loam, very gravelly loam, very stony loam	GP-GC, GM-GC, GC	Moderate			28					
	29-33	Unweathered bedrock	-	-			-					
Dunnlake	0-7	Very stony loam	SC-SM, SC, CL-ML, CL	Moderate	Moderate	Low	.17	1	>6.0	-	12-20	Hard
	7-15	Gravelly cobbly clay	CH, GC	High			.17					
	15-19	Unweathered bedrock	-	-			-					
Fivesprings	0-3	Very stony loam	SC-SM, SM, CL-ML, ML	Low	High	Low	.15	2	>6.0	-	20-40	Hard
	3-8	Very gravelly clay loam	GC	Moderate			.15					
	8-23	Very gravelly clay, Very gravelly clay loam	GC	High			.10					
	23-27	Unweathered bedrock	-	-			-					
Smocreek 530	0-13	Silty clay loam (2e-1)	ML	Moderate	High	Low	.37	5	3.5-5.0	Jan-May	>60	-
	13-60	Silty loam, silty clay loam	CL, ML	Moderate			.37					
Cochran 585	0-11	Very cobbly loam (7s)	GM-GC, GM, GC	Low	Moderate	Low	.10	3	>6.0	-	>60	-
	11-31	Extremely cobbly clay loam, very gravelly clay	GC	Moderate			.10					
	31-60	Stratified extremely gravelly loam, extremely cobbly loamy coarse sand	GM-GC, GM, GC	Low			.10					
Truax 588	0-11	Sandy loam (4e)	SM	Low	Moderate	Low	.32	5	>6.0	-	>60	-
	11-38	Sandy clay loam, loam	SC-SM, SC, CL-ML, CL	Low			.28					
	38-60	Sandy loam	SM	Low			.24					
Galeppi 595	0-18	Sandy loam (2e-1)	SM	Low	Moderate	Low	.24	5	>6.0	-	>60	-
	18-36	Sandy clay loam, clay loam	SC, CL	Moderate			.24					
	36-52	Sandy loam, loam	SM	Low			.28					
	52-60	Loamy sand	SM	Low			.28					
Galeppi 597	0-18	Sandy loam	SM	Low	Moderate	Low	.24	5	>6.0	-	>60	-
	18-36	Sandy clay loam, clay loam	SC, CL	Moderate			.24					
	36-52	Sand loam, loam	SM	Low			.28					
	52-60	Loamy sand	SM	Low			.28					
Ardep 609	0-3	Very fine sand 7e	SM	Low	High	Low	.24	3	>6.0	-	>60	-
	3-59	Loam	ML	Low			.37					
	59-60	Stratified fine sandy loam, sand	SM	Low			.24					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
Mottsville 674	0-17	Gravelly loamy coarse sand 6e	SP-SM, SM	Low	Moderate	Moderate	.05	5	>6.0	-	>60	-
	17-60	Stratified gravelly coarse sand, loamy sand	SP-SM, SM	Low			.10					
677		7e										
Glenbrook	0-3	Gravelly loamy coarse sand	SM, SP-SM	Low	Moderate	Low	.10	1	>6.0	-	10-20	Soft
	3-12	Gravelly loamy coarse sand, gravelly sand, coarse sand	SM, SP-SM	Low			.10					
	12-16	Weathered bedrock	-	-			-					
Graufels	0-14	Bouldery sand	SP-SM, SM	Low	Moderate	Low	.10	2	>6.0	-	20-40	Soft
	14-22	Gravelly loamy coarse sand, gravelly loamy sand	SM	Low			.10					
	22-26	Weathered bedrock	-	-			-					
Rock Outcrop	0-60	Unweathered bedrock	-	-	-	-	-	-	>6.0	-	0-0	Hard
Mottsville 678	0-17	Gravelly loamy coarse sand 4e	SP-SM, SM	Low	Moderate	Moderate	.05	5	>6.0	-	>60	-
	17-60	Stratified gravelly coarse sand, loamy sand	SP-SM, SM	Low			.10					
680		8w										
Fluvents	0-4	Very fine sandy loam	ML	Low	High	Low	.43	5	0-5.0	Dec-Jun	>60	-
	4-60	Stratified cobbly sand, loam	SW-SM, SM, ML, SP-SM	Low			.28					
Riverwash	0-6	Extremely gravelly cobbly sand	GP, GW	Low			-	-	0-2.0	Jan-Dec	>60	
	6-60	Stratified gravelly sand, extremely gravelly cobbly sand	GP, SP, GW, SW	Low			-					
682		(7e)										
Corral	0-4	Loam	CL-ML, ML	Low	Moderate	Low	.32	1	>6.0	-	12-20	Soft
	4-12	Clay loam, loam, sandy clay loam	CL	Moderate			.32					
	12-16	Weathered bedrock	-	-			-					
Glenbrook	0-3	Gravelly loamy coarse sand	SM, SP-SM	Low	Moderate	Low	.10	1	>6.0	-	10-20	Soft
	3-12	Gravelly loamy coarse sand, gravelly sand, coarse sand	SM, SP-SM	Low			.10					
	12-16	Weathered bedrock	-	-			-					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
688		(7e)										
Graufels	0-14	Bouldery sand	SP-SM, SM	Low	Moderate	Low	.10	2	>6.0	-	20-40	Soft
	14-22	Gravelly loamy coarse sand, sand, gravelly loamy sand	SM	Low			.10					
	22-26	Weathered bedrock	-	-			-					
Glenbrook	0-3	Sand	SM, SP-SM	Low	Moderate	Low	.10	1	>6.0	-	10-20	Soft
	3-12	Gravelly loamy coarse sand, gravelly sand, coarse sand	SM, SP-SM	Low			.10					
	12-16	Weathered bedrock	-	-			-					
707		(6s)										
Hagata	0-6	Silty loam	ML	Low	High	Low	.49	4	>6.0	-	20-30	Soft
	6-22	Silty clay	CH	High			.43					
	22-36	Weathered bedrock	-	-			-					
	36-60	Loamy sand, sand	SM	Low			.15					
Playas	0-6	Silty clay	CL, CH, MH	High	High	High	.37	5	-	-	>60	-
	6-60	Silty clay loam, clay, silty clay	CL, CH, MH	High			.37					
710		(4w)										
Dryvalley	0-5	Silty clay loam	CL, ML	Moderate	High	Low	.37	5	-	-	>60	-
	5-34	Silty clay, clay	MH, CH	High			.32					
	34-60	Silty clay loam	CL	Moderate			.37					
Playas	0-6	Silty clay	CL, CH, MH	High	High	High	.37	5	-	-	>60	-
	6-60	Silty clay loam, clay, silty clay	CL, CH, MH	High								
850		(6s)										
Termo	0-2	Silty clay	MH, CH	Moderate	High	Moderate	.37	1	-	-	>60	-
	2-38	Clay	MH	High			.28					
	38-60	Silty clay, clay	MH	High			.28					
	60-65	Silty clay loam, loam	ML	Moderate			.37					
Springmeyer	0-11	Loam	SC, CL	Moderate	High	Low	.32	5	>6.0	-	>60	-
	11-46	Gravelly silty clay loam, silty clay loam, clay loam	SC, CL	Moderate			.20					
	46-60	Stratified extremely gravelly loamy sand, silty clay loam	SC	Moderate			.20					
Smocreek	0-13	Silty clay loam	ML	Moderate	High	Low	.37	5	3.5-5.0	Jan-May	>60	-
	13-60	Silty loam, silty clay loam	CL, ML	Moderate			.37					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
Orr 860	0-8	Sandy loam (2e-1)	SM	Low	Moderate	Low	.17	5	>6.0	-	>60	-
	8-21	Gravelly sandy loam, gravelly sandy clay loam, loam	SC-SM, SC	Moderate Low			.20 .15					
	21-60	Gravelly sandy loam, sandy clay loam	SM, SC-SM									
Barnard 872	0-11	Stony sandy loam (6s)	SM	Low	High	Low	.28	2	>6.0	-	>60	-
	11-20	Clay, silty clay	CH	High			-					
	20-24	Indurated	-	-			-				Cemented 20-40	
Reba 983	0-10	Sandy clay loam (6e-1)	SC or SM-SC	Moderate	Moderate				>5	-	>60	-
	10-21	Silty clay	CL	High	High							
	21-41	Heavy sandy loam	SC	Low	High							
	40-66	Coarse sandy loam	SM	Low								
Savalegui 984	0-12	Heavy loam (4e-1)	CL	Moderate	Low				>5	-	>60	-
	12-51	Sandy clay loam	SM-SC or SC	Moderate	Low							
	51-61	Light sandy loam	SM	Low	High							
Coolbirth 985	0-10	Silt loam 3c, 3-1)	ML or CL	Moderate	Low				>5	-	>68	-
	10-43	Clay loam and gravelly sandy clay loam	SC or CL	High	Moderate							
	43-68	Gravelly coarse sand	GW of SW	Low	Moderate							
Trosi 986	0-7	Very stony sandy loam (6s-1)	SM	Low	Low				>5	-	>60	-
	12-19	Very cobbly clay	CL or GC	Moderate	High							
	19-26	hardpan	-									
	26-60	Sediment	-									
James Canyon 987	0-36	Silt loam (3w-2)	CL-ML	Moderate	High				2-5	-	>60	-
	36-60	Heavy sandy loam and sandy clay loam	SC	Moderate	High							
Loyalton 988	0-8	Fine sandy loam (4s-6)	SM	Low	High				>5-	-	>63	-
	8-33	Sandy clay loam	CL	Moderate	High							
	33-63	Gravelly loamy coarse sand	SP	Low	High							
989		(3e, s, c-1)										
Bidwell	0-38	Sandy clay laom and heavy sandy loam	SC or CL	Moderate	High	-	-	-	>5	-	>60	-
	38-58	Loamy sand	SM	Low	High							
	58-62	Coarse sand and fine gravel	SW	Low	High							

Table F-3 Washoe County Soil Characteristics

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
176 Indian Creek Reno Washoe	0-7 7-19 19-23 23-60	Stony Loam (7s) Gravelly clay, clay, sandy clay Indurated Stratified extremely gravelly loamy coarse sand to gravelly sandy clay loam	SC, SM-SC CH - GP-GM, GM-GC, GM	Low High - Low	High	Low	0.28 0.24 - 0.17	1	>6.0	-	>60	-
Manogue 190	0-2 2-63 63-72	Cobbly clay (7s) Clay, silty clay Weathered bedrock	CH, MH CH, MH -	High High -	High	Moderate	0.24 0.28 -	5	>6.0	-	40-60	Soft
Manogue 190	0-3 3-63 63-72	Cobbly clay (7s) Clay, silty clay Weathered bedrock	CH, MH CH, MH -	High High -	High	Moderate	0.24 0.28	6	>6.0	-	40-60	Soft
Cassiro 251	0-12 12-40 40-60	Gravelly sandy loam (6c) Very gravelly sandy clay, very gravelly clay Variable	SM GC-SC -	Low Moderate -	High	Moderate	0.24 0.20 -	2	>6.0	-	40-65	Soft
Cassiro 252	0-13 13-40 40-60	Gravelly sandy loam (6c) Very gravelly sandy clay, very gravelly clay Variable	SM GC, SC -	Low Moderate -	High	Moderate	0.24 0.20 -	2	>6.0	-	40-65	Soft
Wedekind 280, 281	0-2 2-14 14-60	Gravelly loam (7s) Sandy clay loam, clay loam, gravelly sandy clay loam Weathered bedrock	SM SC -	Low Moderate -	Moderate	Low	0.24 0.20 -	1	>6.0	-	10-20	Soft
Wedekind 282	0-4 4-14 14-60	Gravelly sandy loam (7e) Sandy clay loam, clay loam, gravelly sandy clay loam Weathered bedrock	SM SC -	Low Moderate -	Moderate	Low	0.15 0.20 -	1	>6.0	-	10-20	Soft
Risley 310, 311 Rock outcrop complex	0-4 4-24 24-40	Very stony loam (7s) Clay, clay loam, sandy clay Weathered bedrock	SC, CL CL -	Moderate High -	Moderate	Moderate	0.32 0.20 -	7	>6.0	-	20-30	Soft
Risley 313	0-4 4-40 40-60	Cobbly clay loam (7s) Clay, clay loam Weathered bedrock	CL CH, CL -	Moderate High -	Moderate	Moderate	0.32 0.32 -	6	>6.0	-	20-30	Soft
Lemm 370	0-19 19-40 40-60	Very gravelly coarse sandy loam (7s) Very gravelly coarse sandy loam, very gravelly sandy loam Very gravelly loamy coarse sand, gravelly loamy coarse sand	SM SM-SC, SC SM, SP-SM	Low Low Low	Moderate	Low	0.17 0.20 0.10	5	>6.0	-	>60	-

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
372												
Terca	0-3	Very stony loam	SM-SC, GM-GC	Low	Moderate	Low	0.15	1			14-20	Hard
	3-17	Gravelly clay loam	SC, GC	Low			0.17					
	17-21	Unweathered bedrock	-	-			-					
Devada	0-4	Very stony loam	SM-SC, SC,	-			0.17	1			12-20	Hard
	4-13	Gravelly clay, clay	CL-ML, CL	-			0.17					
	13-17	Unweathered bedrock	-	-			-					
373												
Terca	0-3	Very stony loam	SM-SC, GM-GC	Low	Moderate	Low	0.15	1			14-20	Hard
	3-17	Gravelly clay loam	SC,GC	Low			0.17					
	17-21	Unweathered bedrock	-	-			-					
Softscrabble	0-20	Stony loam	CL-ML, SM-SC	Low	Moderate	Low	0.15	5			>60	-
	20-32	Very cobbly clay loam, extremely cobbly clay loam	CL, GC	Moderate			0.20					
	32-60	Clay loam, gravelly clay loam, loam	CL	Moderate			0.32					
	60-64	Weathered bedrock	-	-			-					
Devada	0-4	Very stony loam	SM-SC, SC, CL-ML, CL	Moderate	Moderate	Low	0.17	1			12-20	Hard
	4-13	Gravelly clay, clay	CH, GC	High			0.17					
	13-17	Unweathered bedrock	-	-			-					
Surprise 460	0-14	Loamy sand (6s)	SM	Low	Moderate	Low	0.17	5	>6.0	-	>60	-
	14-37	Stratified gravelly sandy loam to gravelly loam	SM	Low			0.20					
	37-66	Stratified gravelly loamy sand to sandy loam	SM-GM	Low			0.10					
Dalzell 470	0-14	Loamy fine sand (7w)	SM	Low	High	High	0.17	3	3.5-5.0	Mar-Jun	>60	-
	14-32	Sandy clay loam, loam, silty clay loam Cemented	SC, CL	Moderate			0.32					
	32-36	Sandy loam, loamy sand, gravelly coarse sand	-	-			-					
	36-60		SM, SP-SM	Low			0.24					
Holbrook 482	0-10	Cobbly loamy sand (7s)	SM	Low	High	Low	0.28	5	>6.0	-	>60	-
	10-60	Stratified stony sand to very gravelly loam	GM, SM	Low			0.15					
Settlemeyer 514	0-12	Gravelly loam (6w)	GC, CL, SC	Low	High	Low	0.24	5	1.0-2.5	Feb-Jul	>60	-
	12-35	Silty clay loam, clay loam	CL	Moderate			0.37					
	35-60	Stratified very gravelly loamy sand to silty clay loam	GC, CL, GM-GC, CL-ML	Low			0.24					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
585		(7s)										
Barnard	0-15	Stony sandy loam	SM, SM-SC	Low	High	Low	0.20	1	>6.0	-	>60	-
	15-26	Clay, silty clay	CH	High			0.28					
	26	Indurated	-	-			-					
Trosi	0-12	Very stony sandy loam	SM, GM	Low	High	Moderate	0.10	1	>6.0			
	12-19	Very cobbly clay, very cobbly clay loam	CL, CH, GC	Moderate			0.10			-	>60	-
		Indurated		-								
	19-34	Variable	-	-			-					
	34-60		-				-					
Springmeyer 591	0-13	Stony loam (6s)	SC, CL, SM-SC, CL-ML	Moderate	Moderate	Low	0.32	5	>6.0	-	>60	-
	13-40	Gravelly sandy clay loam, sandy clay loam, clay loam	SC, CL	Moderate			0.20					
	40-60	Stratified very gravelly sandy clay loam to loamy sand	SC	Moderate			0.20					
610												
Haybourne	0-6	Loamy sand	SP-SM, SM	Low	High	-	0.15	5			High	Low
	6-27	Sandy loam, gravelly sandy loam, fine sandy loam	SM	Low			0.28					
	27-60	Stratified gravelly cobbly sand, fine sandy loam	SM	Low			0.15					
Mottsville	0-15	Loamy coarse sand	SP-SM, SM	Low	Moderate	-	0.10	5			Moderate	Moderate
	15-60	Stratified gravelly coarse sand, loamy sand	SP-SM, SM	Low			0.10					
		Sand										
Incy	0-4	Fine sand, sand	SP-SM, SM	Low	Moderate	-	0.10	5			Moderate	Low
	4-60		SP-SM, SM	Low			0.10					
Orr 620	0-10	Stony sandy loam (6c)	SM	Low	Moderate	Low	0.15	5	>6.0	-	>60	-
	10-50	Gravelly sandy clay loam	SM-SC, SC	Moderate			0.20					
	50-60	Stratified very gravelly sand to gravelly sandy loam	GM, SM, GP-GM, SP-SM	Low			0.15					
620x												
Leviathan	0-8	Very stony sandy loam	GM, SM, GM-GC, SM-SC	Low	Moderate	Low	0.17	5			>60	-
	8-60	Very gravelly sandy clay loam	GC, SC	Low			0.10					
Barnard	0-15	Very stony sandy clay loam	SC	Moderate	Moderate	Low	0.15	2			>60	-
	15-26	Clay, silty clay	CH	High			0.28					
	26-30	Indurated	-	-			-					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
Chappuis 630	0-3 3-15 15-45 45-60	Sandy loam (7s) Silty clay Loam, silty loam, silty clay loam Very fine sandy loam, silty loam, loam	SM MH ML CL-ML, ML	Low High Moderate Low	High	Low	0.37 0.32 0.37 0.37	1			>60	-
Oest 662	0-8 8-40 40-60	Extremely stony sandy loam (7s) Very gravelly sandy loam, very gravelly sandy clay loam, very cobbly sandy loam Very gravelly loamy sand, extremely gravelly sand	SM, SM-SC SC SC, SM-SC	Low Low Low	Moderate	Low	0.17 0.17 0.10	5	>6.0	-	>60	-
Oest 663, 664	0-15 15-40 40-60	Very gravelly loam (7s) Very gravelly sandy loam, very gravelly sandy clay loam Very gravelly loamy sand, extremely gravelly loamy sand, extremely gravelly sand	GM-GC GC GP-GM	Low Low Low	Moderate	Low	0.24 0.20 0.20	5	>6.0	-	>60	-
Galeppi 670	0-10 10-22 22-60	Sandy loam (6s) Sandy clay loam, clay loam Sandy loam	SM SC, CL SM	Low Moderate Low	Moderate	Low	0.24 0.24 0.28	5	>6.0	-	>60	-
Galeppi 674	0-10 10-21 21-60	Stony sandy loam (6s) Cobbly sandy clay loam, cobbly clay loam Cobbly sandy loam	SM SC, CL SM	Low Moderate Low	Moderate	Low	0.15 0.24 0.20	5	>6.0	-	>60	-
Galeppi 676	0-9 9-27 27-60	Stony sandy loam (6s) Cobbly sandy clay loam, cobbly clay loam Cobbly sandy loam	SM SC, CL SM	Low Moderate Low	Moderate	Low	0.15 0.20 0.24	5	>6.0	-	>60	-
Barnard 790	0-15 15-26 26	Stony sandy loam Clay, silty clay Indurated	SM CH -	Low High -	High	Low	0.20 0.28 -	2	>6.0	-	>60	-
Reno 683	0-4 4-24 24-47 47	Stony sandy loam (7s) Sandy clay, clay, gravelly clay Cemented Weathered bedrock	SM SC, CH, CL - -	Low High - -	High	Low	0.17 0.24 - -	2	>6.0	-	40-60	Soft
Stodick 730	0-4 4-14 14	Very stony loam (7s) Very gravelly clay loam, very gravelly loam Weathered bedrock	CL-ML GC, SC -	Low Moderate -	Moderate	Low	0.32 0.32 -	2	>6.0	-	14-20	Soft
Reywat 863 Rock outcrop complex	0-6 6-14 14	Extremely stony loam (7s) Very gravelly clay loam, very gravelly loam Unweathered bedrock	GM, SM GC -	Low Moderate -	Moderate	Low	0.28 0.15 -	1	>6.0	-	10-20	Hard

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
Xman 871	0-2	Very stony loam (7s)	SM	Low	High	Low	0.32	1	>6.0	-	10-20	Soft
	2-14	Clay, gravelly clay	CH	High			0.24					
	14-29	Weathered bedrock	-	-			-					
	29	Unweathered bedrock	-	-			-					
880		(7s)										
Zephan	0-8	Very gravelly sandy loam	GM-GC, SM-SC	Low	Moderate	Moderate	0.15	2	>6.0	-	25-40	Soft
	8-35	Very cobbly clay, very cobbly sandy clay, very cobbly clay loam	GC, CH	High			0.10					
	35-42	Weathered bedrock	-	-			-					
Rock outcrop-Smallcone complex	0-6	Very gravelly sandy loam	GP-GM, GM, SP-SM, SM	Low	Moderate	High	0.10	1	>6.0	-	4-10	Soft
	6	Weathered bedrock	-	-			-					
Zephan 882	0-8	Stony sandy loam (882)	SM-SC, SC	Low	Moderate	Moderate	0.15	2	>6.0	-	25-40	Soft
	8-35	Very cobbly clay, very cobbly sandy loam clay, very cobbly clay loam	GC, CH	High			0.10					
	35-42	Weathered bedrock	-	-			-					
Indiano 890	0-14	Gravelly loam (6e)	GM, GM-GC, ML, CL-ML	Low	Moderate	Low	0.32	3	>6.0	-	20-40	Hard
	14-29	Clay loam, sandy clay loam, gravelly clay loam	SC, CL, GC	Moderate			0.28					
	29	Unweathered bedrock	-	-			-					
892		(7s)										
Indiano	0-13	Gravelly loam	GM, GM-GC, ML, CL-ML	Low	Moderate	Low	0.32	3	>6.0	-	20-40	Hard
	13-33	Clay loam, sandy clay loam, gravelly clay loam	SC, CL, GC	Moderate			0.28					
	33	Unweathered bedrock	-	-			-					
Koontz	0-6	Cobbly loam	SM, ML	Low			0.24	2			14-20	Soft
	6-18	Very gravelly loam, very gravelly clay loam	GC	Moderate			0.24					
	18	Weathered bedrock	-	-			-					
Flex	0-3	Very gravelly sandy loam	GM, SM	Low			0.17	1			6-12	Soft
	3-10	Very gravelly sandy clay loam, very gravelly sandy loam	GM-GC, GC	Low			0.17					
	10	Weathered bedrock	-	-			-					

Soil Name and Map Symbol	Depth (In.)	USDA Texture (Capability Group)	Unified Soil Classification System	Shrink-swell Potential	Risk of Corrosion		Erosion Factors		High Water Table		Bedrock	
					Uncoated Steel	Concrete	K	T	Depth (Ft.)	Months	Depth (In.)	Hardness
895		(7s)										
Indiano	0-13	Stony fine sandy loam	SM	Low	Moderate	Low	0.32	3	>6.0	-	20-40	Hard
	13-33	Clay loam, sandy clay loam, gravelly clay loam	SC, CL, GC	Moderate			0.28					
	33	Unweathered bedrock	-	-			-					
Zephan	0-8	Very stony sandy loam	SM-SC	Low	Moderate	Moderate	0.15	2			25-40	Soft
	8-35	Very cobbly clay, very cobbly sandy clay, very cobbly clay loam	GC, CH	High			0.10					
	35-42	Weathered bedrock	-	-			-					
Duco	0-7	Very stony sandy loam	SM-SC, GM-GC	Low	Moderate	Low	0.17	1			10-20	Hard
	7-15	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam	GC	Moderate			0.24					
	15	Unweathered bedrock	-	-			-					
Flex 900	0-3	Very gravelly sandy loam (7s)	GM, SM	Low	Moderate	Low	0.17	1	>6.0	-	6-12	Soft
	3-10	Very gravelly clay loam, very gravelly sandy loam	GM-GC, GC	Low			0.17					
	10	Weathered bedrock	-	-			-					
Flex 901	0-4	Very gravelly sandy loam (7s)	GM, SM	Low	Moderate	Low	0.17	1	>6.0	-	6-12	Soft
	4-10	Very gravelly sandy clay loam, very gravelly sandy loam	GM-GC, GC	Low			0.17					
	10	Weathered bedrock	-	-			-					
Old Camp 930	0-7	Stony sandy loam (7s)	SM	Low	High	Low	0.17	1	>6.0	-	10-20	Hard
	7-17	Very cobbly clay loam, very stony sandy clay loam, very stony loam	GC, SC	Moderate			0.17					
	17	Unweathered bedrock	-	-			-					
Aladshi 974	0-6	Gravelly sandy loam (6c)	SM	Low	High	Low	0.24	5	>6.0	-	>60	-
	6-34	Gravelly loam, sandy clay loam, sandy loam	SC, CL	Moderate			0.28					
	34-60	Stratified very gravelly loam, extremely gravelly loamy sand	SM	Low			0.24					
Koontz 980	0-5	Gravelly loam (7s)	SM, ML	Low	Moderate	Low	0.32	2	>6.0	-	14-20	Soft
	5-18	Very gravelly loam, very gravelly clay loam	GC	Moderate			0.24					
	18	Weathered bedrock	-	-			-					
Koontz 982	0-6	Stony loam (7s)	SM, ML	Low	Moderate	Low	0.28	2	>6.0	-	14-20	Soft
	6-18	Very gravelly loam, very gravelly clay loam	GC	Moderate			0.28					
	18	Weathered bedrock	-	-			-					

Mahogany Ridge	Modoc	1-A-1	1:24,000	Published	1980
Alturas	Modoc	1-B-1	1:24,000	Published	1980
Infernal Canyons	Modoc	3-C-1	1:24,000	Published	1980
Likely	Modoc/Lassen	3-D-1	1:24,000/1:24,000	Published/Preliminary	1980/1994
Holbrook Canyon	Lassen	5-E-1	1:24,000	Preliminary	1994
Madeline	Lassen	5-E-2	1:24,000	Preliminary	1994
Anderson Mountain	Lassen	5-F-1	1:24,000	Preliminary	1994
McDonald Peak	Lassen	5-F-2	1:24,000	Preliminary	1994
Cleghorn Flat	Lassen	7-G-1	1:24,000	Preliminary	1994
Termo	Lassen	7-G-2	1:24,000	Preliminary	1994
Ravendale	Lassen	7-G-3	1:24,000	Preliminary	1994
W. of Snowstorm Mtn	Lassen	7-H-2	1:24,000	Preliminary	1994
Snowstorm Mtn	Lassen	7-H-3	1:24,000	Preliminary	1994
Shinn Mtn	Lassen	7-H-4	1:24,000	Preliminary	1994
Karlo	Lassen	9-I-3	1:24,000	Preliminary	1994
Five Springs	Lassen	9-I-4	1:24,000	Preliminary	1994
Shaffer Mtn	Lassen	9-J-3	1:24,000	Preliminary	1994
Little Mud Flat	Lassen	9-J-4	1:24,000	Preliminary	1994
Wendel	Lassen	11-K-4	1:24,000	Preliminary	1994
Spencer Creek	Lassen	11-K-5	1:24,000	Preliminary	1994
Calneva Lake	Lassen	11-L-5	1:24,000	Preliminary	1994
Doyle	Lassen	13-M-5	1:24,000	Preliminary	1994
Constantia	Lassen	13-N-5	1:24,000	Preliminary	1994
Stateline Peak	Washoe	14-M-6	1:24,000	Preliminary	1994
Seven Lakes Mtn	Washoe	14-N-6	1:24,000	Published	1983
Beckwourth Pass	Lassen	15-O-5	1:24,000	Published	1993
Evans Canyon	Lassen/Sierra	15-P-5	1:24,000	Published	1993
Reno NW	Washoe	16-P-6	1:24,000	Published	1983
Verdi	Washoe	18-Q-6	1:24,000	Published	1983
Reno	Washoe	18-Q-7	1:24,000	Published	1983

Appendix G
Noise

APPENDIX G

NOISE

NOISE METHODOLOGIES AND SUPPORTING DATA

This Appendix provides supporting information to Section C.9 in Part C. Included are general information used in impact analysis and particular information on how noise would be generated by Project construction and operation.

Noise Levels of Familiar Sources

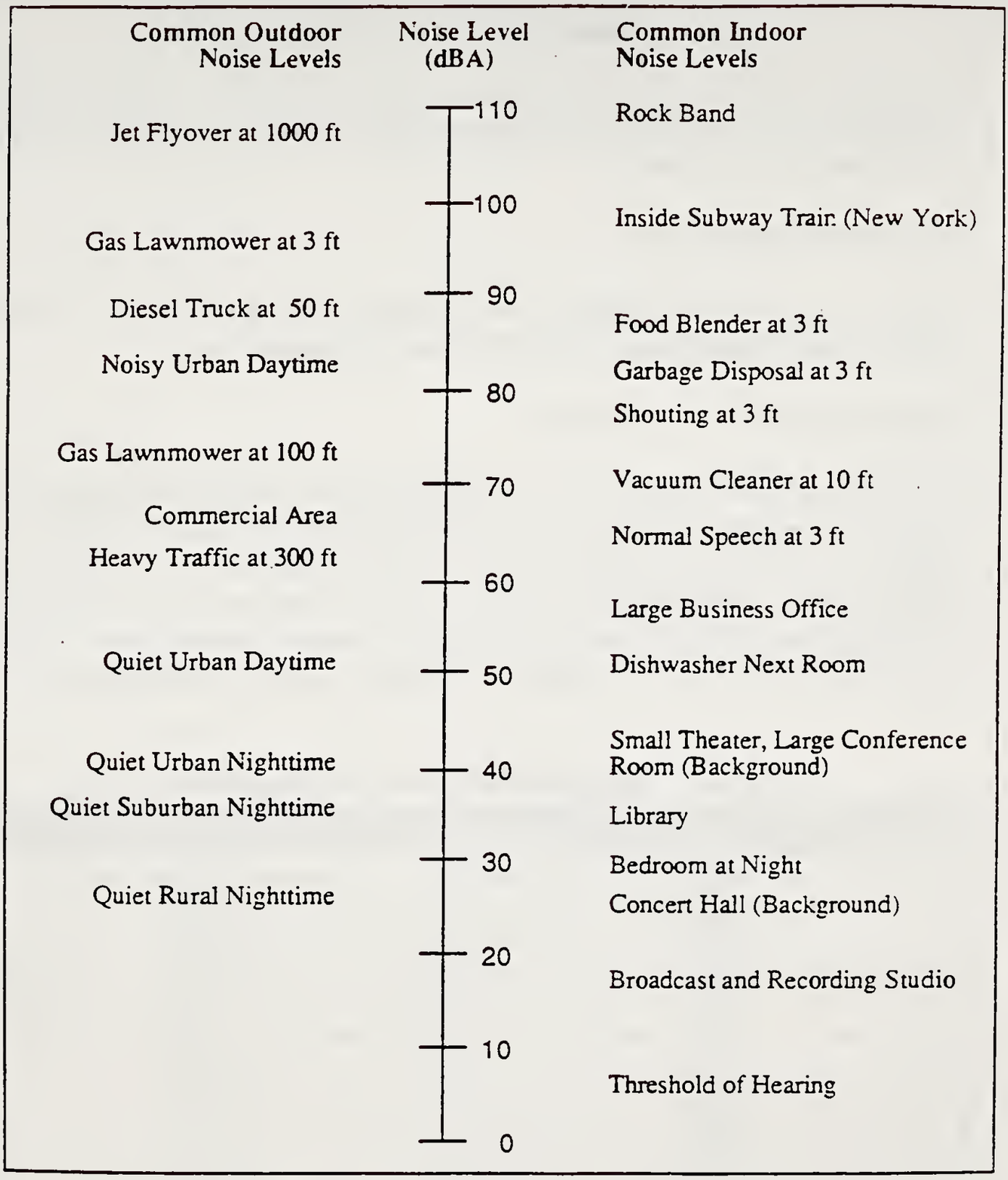
Figure G-1 is a scale showing typical noise levels encountered in common daily activities. It provides a basis for understanding the ambient noise levels discussed in Section C.9.

Methodology for Summation of Noise Levels

Two basic steps in impact analysis are (1) to determine the degree to which ambient noise will "mask" out project noise and reduce impact, and (2) determine how the noise from one (or more) lesser sources augments the noise level of the loudest source. Noise levels in decibel units are not linearly additive since the decibel is a logarithmic unit. When noise from more than one source is being generated simultaneously, the correct dBA value can be obtained by using the summation chart in Table G-1. Progressively other noise sources can be added to the cumulative sound by again using the chart.

Table G-1 dBA Summation Chart for Two Noise Sources

When Two Decibel Values Differ By—	Add the Following Amount to the Higher Value
0 dBA	3 dBA
1 dBA	2.5 dBA
2 dBA	2.1 dBA
3 dBA	1.8 dBA
3 dBA	1.5 dBA
5 dBA	1.2 dBA
6 dBA	1.0 dBA
7 dBA	0.8 dBA
8 dBA	0.6 dBA
9 dBA	0.5 dBA
10 or 11 dBA	0.4 dBA
12 or 13 dBA	0.3 dBA
14 or 15 dBA	0.2 dBA
16 dBA	0.1 dBA
17 or more dBA	0 dBA



Source: (SCAQMD, 1993)

Figure G-1 Common Environmental Noise Levels

By adding, for example, the noise level that results at a sensitive receptor from a major nearby source to the ambient noise level that results from innumerable background sources using the above chart, the estimated resultant ambient level is obtained. The same procedure applies when adding project construction noise to the ambient level. A comparison of the resultant level with the ambient level is used to determine impact. The Table shows that the project noise level MUST be perceived as higher at the sensitive receptor than the ambient level to result in a discernable increase in noise level (i.e. 5 dBA or more). In this case the increment using the above Table is added to the project noise and then the ambient level is subtracted to obtain the "noise increment." This increase can then be compared to significance criteria. Note that the impact must be individually judged in each case when the project noise has an irregular, "grating" or other noise character distinctly different from ambient noise. The increment in level can then be less than the significance criterion value and still represent either some or a severe (significant) impact.

Noise Sources and Levels

Table G-2 lists equipment which are typically required in the construction or improvement of access roads, erection of structures, stringing of conductors and ground wires, and construction of substations, and that are significant from a noise analysis standpoint. Also included in this list are the corresponding A-weighted noise emission characteristics of the equipment.

Table G-2 Noise Emission Characteristics of Construction Equipment

Equipment	Typical Range[1]	Analysis Value[2]
Jack hammers and drills	75-98	85
D-8 bulldozer, or equivalent	82-95	85
Tractors (various)	74-98	85
Trucks (various)	70-97	85
Truck leaving construction site	72-80	78
Backhoe	80-92	85
Truck w/auger	82-92	82
Scrapers and graders	80-92	85
Ditching machine	80-92	80
Motor crane (small)	74-87	78
Motor crane (large)	72-86	82
Pickup	70-98	70
Concrete mixers	72-91	80
Welding rig	72-82	70
Helicopter (various)	80-92	85

Notes: [1] Data are adapted from U.S. Environmental Protection Agency NTID 300.1, 1972, pg.2-108, and other sources (levels are in dBA at 50-foot reference distance.). These values are based on a range of equipment and operating conditions.
[2] Analysis values are intended to reflect noise levels from equipment in good condition, with well-fitted mufflers, air intake silencers, etc., operating at near-peak level. In addition, these values assume some averaging of sound level over all directions from the listed piece of equipment.

Impact Assessment of Pipeline Construction

Section B.2.3.2 (Project Description, Volume I) describes procedures and equipment used in constructing the transmission line. Figures B.2-14a and B.2-14b provide illustration. A D-8 bulldozer and in some cases a dump truck would be the principal noise sources when constructing four new access roads, upgrading existing access roads, blading of rough areas to allow overland passage, clearing temporary sites for wire setup, assembling and erecting structures or helipads, and leveling staging areas. A vehicle-mounted power auger or a tracked backhoe would be used to excavate the foundations for structures. In non-fractured lava flow areas, the foundation holes would be excavated by drilling and blasting. A blasting mat would be employed for safety during use of plastic explosives, and to reduce noise. Structure components and sub-assemblies would be assembled near each foundation using a boom truck or small mobile crane. A large mobile crane would be used to erect the structure. Stringing of structures would require use of a large puller truck carrying five reels of wire rope, a D-6 bulldozer or caterpillar tractor, a tensioner truck, and two trucks carrying conductor and shield wire. Sierra Pacific Power Company may use helicopters in steep terrain or that containing sensitive habitat. Trucks would be the principal noise sources during cleanup of the right-of-way and site restoration. Augers, backhoes, trucks, dozers, and cranes would also be used in the construction of substations. Trenching equipment would be used to prepare for installing buried conductors. Concrete mixers would be brought onsite when pouring concrete slabs and footings.

Impact Assessment of Transmission Line Construction

Twelve to 20 structures, 1,200 feet apart on average, would be erected on a typical work day; while the group erected the previous day would be strung with conductor wires. Several crews, as illustrated in Figure B.2-14a, would work simultaneously to erect structures, while only one crew would string conductors, as illustrated in Figure B.2-14b.

Noise levels and duration could differ widely at individual sensitive receptors, depending upon the need for grading, the receptor's proximity to structures, on the ambient noise level, on the amount of noise attenuation by terrain and vegetation, and on whether a nearby structure would be the location for stringing conductors. The location of significant construction noise generation can be known precisely only for those sensitive receptors situated near proposed new access roads, or near an angle point. In the latter case, the distance between nearest construction and the receptor is known. Also, there is a reasonable probability that a group of structures would be strung with conductors, starting at the angle point. Various equipment scenarios were analyzed for noise levels, including ground clearance, excavation for foundations, structure assembly, its erection, and stringing of conductors. The highest noise levels were found to occur under the assumption that a backhoe, truck with auger, and a mobile crane would be running simultaneously during the preparation of a foundation, assembly of a structure or its erection, with two trucks operating within the distance to the nearest other structures (i.e. 1,200 to 1,500 feet away). Noise from other ground clearance activities was not included in estimates on the assumption that it would not always occur simultaneously with these sources.

Maximum noise levels and the approximate duration of impact was estimated using a project-specific computer model. The model determined the maximum distance along the ROW where structures could be erected and produce noise impact at a sensitive receptor. This distance also gave a rough estimate of the duration of impact, based on the likely rate of progress in installing structures. The noise level would be greater, but of shorter duration, if more than one crew would be working near a sensitive receptor. Such cases were not modeled.

The noise impact on a sensitive receptor from construction was found by the computer model to depend most sensitively on the ambient noise level. Sensitive receptors in a daytime noise environment around 40 dBA would be severely impacted if they would be within 2,000 feet from construction. The distance would be halved when terrain would provide moderate noise attenuation (i.e. approximately 5 dBA) or the ambient level would increase to about 45 dBA. While impact under conditions of a quiet environment could occur over more than one day, the duration would be significantly shortened when masking noise from nearby traffic would be present.

Corona Noise

Corona noise levels were calculated at the edge of the Project corridor for the proposed 345 kV and 230 kV transmission line configurations. These calculations were done for fair and rainy conditions. The modeled results are the median noise level (L_{50}), the level exceeded 50 percent of the time. The results are listed in Table G-3.

The audible noise from the Alturas 345 kV and 230 kV transmission lines would be comparable to the values that have been found for other lines of similar voltage. Along most of the Alturas route the median ambient noise level is approximately 40 dBA. The bottom part of Table G-3 lists the noise that results from combining the modeled corona noise with an average ambient L_{50} of 40 dBA. Median post project noise levels under fair and rainy conditions are below 55 dBA. Corona noise along the Project route would, therefore, meet the EPA noise guidelines of 55 dBA (nighttime adjusted) for outdoor activity. Rainy noise levels were computed assuming 24 hours of rain, a conservative assumption. In most cases, the audible noise level would vary between fair and rainy conditions over a 24-hour period.

Table C.9-5 Corona Noise for Alturas Transmission Line Configurations

Configuration	795 ACSR[1]		954 ACSR	
	Fair	Rainy	Fair	Rainy
Modeled Corona Noise				
345 kV Vertical	29.3 dBA	54.3 dBA	27.6 dBA	52.6 dBA
345 kV H-Frame	28.3 dBA	53.3 dBA	24.0 dBA	49.0 dBA
230 kV Vertical (Double Circuit)	11.2 dBA	36.2 dBA	9.5 dBA	34.5 dBA
230 kV H-Frame (Double Circuit)	11.6 dBA	36.6 dBA	9.9 dBA	34.9 dBA
Corona Noise Plus Average 40 dBA Ambient				
345 kV Vertical	40.4 dBA	54.5 dBA	40.3 dBA	52.9 dBA
345 kV H-Frame	40.3 dBA	53.5 dBA	40.1 dBA	49.5 dBA
230 kV Vertical (Double Circuit)	40.0 dBA	41.5 dBA	40.0 dBA	40.1 dBA
230 kV H-Frame (Double Circuit)	40.0 dBA	41.8 dBA	40.0 dBA	40.1 dBA

Notes: 1 ASCR: Aluminum Conductor Steel Reinforced

REFERENCES

Aspen Environmental Group. 1993. *Pacific Pipeline Project, Draft Environmental Impact Report.* Three volumes, prepared for the California Public Utilities Commission. April 26.

SCAQMD/South Coast Air Quality Management District. 1993. *Final Environmental Impact Report for Unocal Los Angeles Refinery Wilmington and Carson Plants Reformulated Gasoline Project.* Prepared by ENSR Consulting and Engineering. November.

ALTURAS TRANSMISSION LINE EIR/S

Figure H-1a

Key Observation Points Along Transmission Line Route

Proposed Transmission Line Route

Alternative Transmission Line Route

N
W E
S

0 5 10

Scale in Miles

Basemap: USGS 1:250,000 Quadrangles:
Alturas, CA Rev. 1971.

KOP 1
KOP 2B,D
KOP 3
KOP 4
KOP 5
KOP 6
KOP 7
KOP 20
KOP 21
KOP 22
KOP 23
ALTURAS SUBSTATION & COMMUNICATION SITE
STAGING AREA
A
B
C
D
E
Matchline

ALTURAS TRANSMISSION LINE EIR/S

Figure H-1b

Key Observation Points Along Transmission Line Route

Proposed Transmission Line Route

Alternative Transmission Line Route

N
W E
S

0 5 10

Scale in Miles

Basemap: USGS 1:250,000 Quadrangles; *Alturas, CA* Rev. 1971; *Susanville, CA* Rev. 1962.

Matchline

D

E

G

F

H

I

K

J

L

KOP 8B,8D,E

STAGING AREA

COMMUNICATION SITE

KOP 9

KOP 10B,D

ESVA

Matchline

ALTURAS TRANSMISSION LINE EIR/S

Figure H-1c

Key Observation Points Along Transmission Line Route

Proposed Transmission Line Route

Alternative Transmission Line Route

N
W E
S

0 5 10

Scale in Miles

Basemap: USGS 1:250,000 Quadrangles: *Susanville, CA* Rev. 1962; *Chico, CA* Rev. 1970; *Lovelock, NV* 1970; *Reno, NV* 1971.

Matchline

KOP 11

ESVA

STAGING AREA

KOP 12

COMMUNICATION SITE

KOP 24

Matchline

ALTURAS TRANSMISSION LINE EIR/S

Figure H-1d

Key Observation Points Along Transmission Line Route

Proposed Transmission Line Route

Alternative Transmission Line Route

N
W E
S

0 5 10

Scale in Miles

Basemap: USGS 1:250,000 Quadrangles: *Susanville, CA* Rev. 1962; *Chico, CA* Rev. 1970; *Lovelock, NV* 1970; *Reno, NV* 1971.

Q
R
S
T
U
Z
W
WCFG
X
X-East
Y

KOP 13
KOP 14
KOP 15
KOP 16
KOP 17
KOP 18
KOP 19

STAGING AREA
BORDER TOWN SUBSTATION & COMMUNICATION SITE

STAGING AREA
NORTH VALLEY ROAD SUBSTATION & COMMUNICATION SITE

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
1
LOCATION
Crowder Flat Road, view to the southeast
VRM CLASS
USFS VQO: M-PR
ANALYST
Michael Clayton
DATE
06/16/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Flat to angular, subordinate	Complex, irregular	–
LINE	Horizontal, irregular	Smooth to jagged, complex	–
COLOR	Tan, gray	Tan, light green, dark green	–
TEXTURE	Fine to smooth	Medium to coarse	–

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear, symmetrical
LINE	Same	Same	Vertical
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓					✓		
LINE	✓				✓						✓	
COLOR	✓				✓					✓		
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT

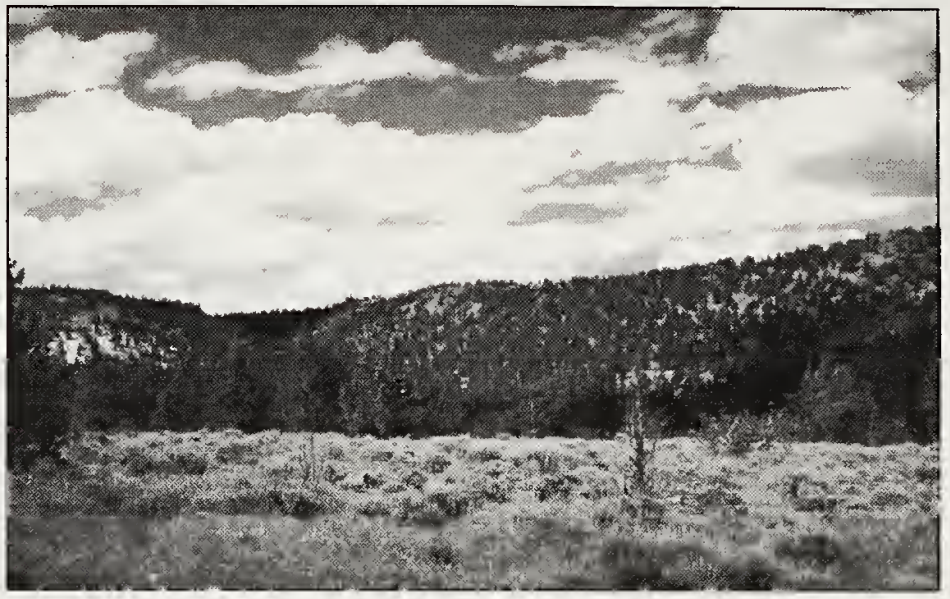
LEVEL OF CHANGE: ☐ VERY LOW ☑ LOW ☐ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☑ YES ☐ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
2
LOCATION
Crowder Flat Road, 500 yards south of Crowell access road, view to the north and east.
VRM CLASS
USFS VQO: M-PR / BLM VRM: Class II
ANALYST
Michael Clayton
DATE
06/16/94



CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Flat to rounded, dominant	Complex, irregular	-
LINE	Horizontal	Smooth to jagged, complex	-
COLOR	Tan, gray	Tan, light green, dark green	-
TEXTURE	Smooth to coarse	Medium to coarse	-

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Same	Vertical
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓					✓		
LINE	✓				✓					✓		
COLOR	✓				✓					✓		
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT

LEVEL OF CHANGE: ☐ VERY LOW ☑ LOW ☐ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☑ YES ☐ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
2
LOCATION
Crowder Flat Road, 500 yards south of Crowell access road; view to the north and east
VRM CLASS
Not Classified
ANALYST
Michael Clayton
DATE
06/16/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Dominant, rounded	Prominant, complex, compatible	-
LINE	Undulating, curvilinear	Horizontal, soft to jagged	-
COLOR	Tan	Yellow, brown, tan, light green, dark green	-
TEXTURE	Smooth to granular, and rough	Medium, random, gradational, matte	-

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Prominent, linear
LINE	Same	Same	Vertical
COLOR	Same	Same	Brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓							✓
LINE	✓				✓							✓
COLOR	✓				✓					✓		
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☐ LOW ☑ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☐ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
3
LOCATION
Highway 299 at Rattlesnake Creek, view to the northwest
VRM CLASS
II
ANALYST
Michael Clayton
DATE
06/17/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Dominant, flat to angular	Regular, vegetative blocks	Flat and curving; parallel, linear
LINE	Horizontal to diagonal	Horizontal, smooth to jagged	Broken vertical; continuous horizontal
COLOR	Tan to brown	Light green, dark green	Brown, gray, black, yellow, white
TEXTURE	Smooth to granular	Fine to medium, gradational, matte	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Potential for linear forms created by clearing	Same
LINE	Same	Potential for prominant vertical and diagonal lines resulting from edge effect of clearing	Same
COLOR	Same	Same	Same
TEXTURE	Same	Same	Same

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓					✓					✓	
LINE	✓					✓						✓
COLOR	✓				✓					✓		
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☐ LOW ☑ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☑ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
4
LOCATION
Highway 299 at Rock Creek crossing; view to the east
VRM CLASS
II
ANALYST
Michael Clayton
DATE
06/17/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Subordinate, flat to gently rolling	Dominant, dinstinct, angular	Linear
LINE	Undulating, weak	Bold, jagged, complex	Hard horizontal and continuous vertical
COLOR	Tan, light green (in distance)	Tan, light green, dark green	Gray, brown, white, black, yellow, green
TEXTURE	Smooth to granular	Smooth to matte	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Same
LINE	Same	Same	Same
COLOR	Same	Same	Same
TEXTURE	Same	Same	Same

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓							✓
LINE	✓				✓							✓
COLOR	✓				✓					✓		
TEXTURE	✓				✓				✓			

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☐ LOW ☑ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☑ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
5
LOCATION
Bayley Reservoir , view to the east-southeast
VRM CLASS
II
ANALYST
Michael Clayton
DATE
06/18/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Flat to rolling	Patchy	–
LINE	Rounded, diagonal, soft	Distinct to jagged to curved	–
COLOR	Tan	Tan, light green, dark green	–
TEXTURE	Smooth to granular	Smooth to matte	–

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Same	Vertical
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓					✓		
LINE	✓				✓					✓		
COLOR	✓				✓					✓		
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☑ LOW ☐ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☑ YES ☐ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
6
LOCATION
Access Road to Proposed Infernal Caverns Trailhead Parking Lot; view to the northwest
VRM CLASS
II
ANALYST
Michael Clayton
DATE
06/18/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	-	Clumps, discontinuous	-
LINE	Indistinct	Jagged, angular, vertical	-
COLOR	Tan	Light green, dark green, brown	-
TEXTURE	Granular	Matte, coarse	-

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Same	Vertical
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓				✓			
LINE	✓				✓				✓			
COLOR	✓				✓				✓			
TEXTURE	✓				✓				✓			

TERM: ☑ LONG ☐ SHORT

LEVEL OF CHANGE: ☑ VERY LOW ☐ LOW ☐ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☑ YES ☐ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
7
LOCATION
Dry Creek Fire Station; view to the west
VRM CLASS
II
ANALYST
Michael Clayton
DATE
06/19/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Flat to rounded terrain, prominent	Simple to complex forms created by regular to irregular vegetative patterns	Linear (fence) and tank
LINE	Rounded, horizontal, converging, diagonal	Horizontal and jagged to indistinct	Horizontal, vertical
COLOR	Tan	Straw, light green, dark green	Brown, red
TEXTURE	Smooth	Matte, smooth	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	linear
LINE	Same	Potential for diagonal lines created by ROW clearing	vertical
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓						✓	
LINE	✓						✓				✓	
COLOR	✓				✓					✓		
TEXTURE	✓				✓				✓			

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☐ LOW ☑ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☑ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
8B
LOCATION
Highway 395 north of Angle Point E8 and Moran; view to the northwest
VRM CLASS
III
ANALYST
Michael Clayton
DATE
06/20/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Flat to angular blocks	Well-defined, distinct blocks	Linear, well-defined strips
LINE	Horizontal to diagonal	Horizontal/diagonal	Vertical to diagonal, continuous/ perpindicular, broken
COLOR	Tan	Straw, light green, dark green	Gray and brown
TEXTURE	Smooth to granular	Matte	Smooth to granular

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Same	Vertical
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓							✓
LINE	✓				✓							✓
COLOR	✓				✓					✓		
TEXTURE	✓				✓				✓			

TERM: ☑ LONG ☐ SHORT

LEVEL OF CHANGE: ☐ VERY LOW ☐ LOW ☐ MODERATE ☑ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☑ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
8D
LOCATION
Highway 395 north of Angle Point E8 and Moran; view to the west toward Alternative Route Segment F
VRM CLASS
III and IV
ANALYST
Michael Clayton
DATE
06/20/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Flat to angular blocks	Well-defined, distinct blocks	Linear, well-defined strips
LINE	Horizontal to diagonal	Horizontal/diagonal	Vertical to diagonal, continuous/ perpindicular, broken
COLOR	Tan	Straw, light green, dark green	Gray and brown
TEXTURE	Smooth to granular	Matte	Smooth to granular

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Same	Vertical
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓					✓		
LINE	✓				✓					✓		
COLOR	✓				✓					✓		
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT

LEVEL OF CHANGE: ☐ VERY LOW ☑ LOW ☐ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☑ YES ☐ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
8E
LOCATION
Highway 395 north of Angle Point E8 and Moran; view to the west toward Alternative Route Segment G
VRM CLASS
III and IV
ANALYST
Michael Clayton
DATE
06/20/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Flat to angular blocks	Well-defined, distinct blocks	Linear, well-defined strips
LINE	Horizontal to diagonal	Horizontal/diagonal	Vertical to diagonal, continuous/ perpindicular, broken
COLOR	Tan	Straw, light green, dark green	Gray and brown
TEXTURE	Smooth to granular	Matte	Smooth to granular

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Same	Vertical
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓					✓		
LINE	✓				✓						✓	
COLOR	✓				✓					✓		
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT

LEVEL OF CHANGE: ☐ VERY LOW ☑ LOW ☐ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☑ YES ☐ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
9
LOCATION
Tule Patch Spring Rest Area on Highway 395, view to the east and southeast
VRM CLASS
III
ANALYST
Michael Clayton
DATE
06/20/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Horizontal to angular land form	Linear landform created by access road; patchy	Linear and strip
LINE	Horizontal and diagonal	Discontinuous, jagged line	Rectangular, diagonal, continuous
COLOR	Tan	Light green to dark green	Gray, white, eyllow, green, brown
TEXTURE	Smooth to granular	Matte	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Same	Vertical
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓							✓
LINE	✓				✓							✓
COLOR	✓				✓						✓	
TEXTURE	✓				✓						✓	

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☐ LOW ☐ MODERATE ☑ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☑ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
10B
LOCATION
Highway 395 in Secret Valley, view to the north
VRM CLASS
III
ANALYST
Michael Clayton
DATE
06/20/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Flat to angular blocks	Defined block by road	Linear and strip, prominent
LINE	Horizontal to diagonal	Vertical (by road edge) and diagonal	Vertical/continuous/bold Horizontal/broken/weak
COLOR	Tan, gray	Mottled straw and light green/dark green	Gray, brown, black, white, yellow
TEXTURE	Granular to smooth	Matte	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear and narrow
LINE	Same	Same	Vertical
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓							✓
LINE	✓				✓							✓
COLOR	✓				✓						✓	
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT

LEVEL OF CHANGE: ☐ VERY LOW ☐ LOW ☐ MODERATE ☑ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☑ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
10D
LOCATION
Highway 395 in Secret Valley, view to the east.
VRM CLASS
III
ANALYST
Michael Clayton
DATE
09/08/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Flat to sloping	Simple and uniform	Linear, symmetrical
LINE	Horizontal to angular	Non-distinct	Vertical, horizontal
COLOR	Tan	Tan to brown	Gray and brown
TEXTURE	Smooth	Medium, random, gradational, matte	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear, subordinate
LINE	Same	Same	Vertical
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓					✓		
LINE	✓				✓					✓		
COLOR	✓				✓					✓		
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT

LEVEL OF CHANGE: ☐ VERY LOW ☑ LOW ☐ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☑ YES ☐ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
11
LOCATION
Highway 395, north of Noble Emigrant Trail Marker; view to the east and southeast
VRM CLASS
III - IV
ANALYST
Michael Clayton
DATE
06/20/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Rolling hills	Uniform, intermixed, striated	Linear
LINE	Curvilinear to angular, simple	Defined horizontal by RR, otherwise indistinct , soft	Horizontal and vertical
COLOR	Tan, brown, distant blue	Straw to light green to tan	Brown
TEXTURE	Smooth to matte	Smooth to matte, continuous	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Same	Vertical
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓						✓	
LINE	✓				✓						✓	
COLOR	✓				✓					✓		
TEXTURE	✓				✓				✓			

TERM: ☑ LONG ☐ SHORT

LEVEL OF CHANGE: ☐ VERY LOW ☐ LOW ☑ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☑ YES ☐ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
12
LOCATION
Road east from Wendel, view to the east
VRM CLASS
IV
ANALYST
Michael Clayton
DATE
06/21/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Massive angular blocks, prominent	Blocks defined by road, clumps	Linear, strip
LINE	Horizontal to angular	Linear, well-defined by road, irregular	Vertical to diagonal
COLOR	Tan to brown	Straw to light green and dark green	Gray, brown, yellow
TEXTURE	Matte to granular	Smooth to matte	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Same	Vertical to horiztonal and curved
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓						✓	
LINE	✓				✓						✓	
COLOR	✓				✓						✓	
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☐ LOW ☑ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☑ YES ☐ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
13
LOCATION
Highway 395, approximately 0.3 miles North of Red Rock Road; view to the south
VRM CLASS
III
ANALYST
Michael Clayton
DATE
06/21/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Dominant, angular	Irregular, short, smooth	Linear, strip, definite
LINE	Diagonal, horizontal, jagged	Irregular, Soft	Vertical, curved, hard
COLOR	Tan to brown	Light green, dark green	Gray, brown, yellow, white
TEXTURE	Smooth to coarse	Matte, uneven, sparse	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Same	Vertical, horizontal, curved
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓							✓
LINE	✓				✓							✓
COLOR	✓				✓						✓	
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☐ LOW ☐ MODERATE ☑ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☑ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
14
LOCATION
Red Rock Road at Highway 395, view to the east-northeast
VRM CLASS
II
ANALYST
Michael Clayton
DATE
06/21/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Prominent, rounded	Indistinct, diverse, clumps	Linear, indistinct
LINE	Horizontal and diagonal, gentle, rolling	Irregular, complex	Vertical, weak
COLOR	Tan to red	Subtle, light green to dark green	Brown
TEXTURE	Smooth to granular	Matte, uneven, random	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Same	Vertical, horizontal, curved
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓							✓
LINE	✓				✓							✓
COLOR	✓				✓						✓	
TEXTURE	✓				✓						✓	

TERM: ☑ LONG ☐ SHORT

LEVEL OF CHANGE: ☐ VERY LOW ☐ LOW ☐ MODERATE ☑ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☑ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
15
LOCATION
Highway 395, 1.7 miles South of Red Rock Road, view to the north-northeast
VRM CLASS
II
ANALYST
Michael Clayton
DATE
06/21/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Prominent, rounded	Complex	Linear, strip, definite
LINE	Rolling, diagonal	Defined vertical by road, diagonal, patchy, sparse	Vertical, diagonal, continuous
COLOR	Tan to red	Light green, dark green, mottled	Gray, brown, white, yellow
TEXTURE	Smooth	Matte, medium to sparse	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Same	Vertical, horizontal, curved
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓						✓	
LINE	✓				✓							✓
COLOR	✓				✓						✓	
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT

LEVEL OF CHANGE: ☐ VERY LOW ☐ LOW ☑ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☑ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
16
LOCATION
East side access road - view to the south
VRM CLASS
III
ANALYST
Michael Clayton
DATE
06/21/94 and 07/01/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Dominant, rounded	Well-defined and simple vegetative patterns	Strip road, geometric, rectangular structure
LINE	Horizontal, flowing to angular, simple	Irregular to diagonal, soft	Angular - structure Curved - road, weak
COLOR	Tan	Tan, light green, dark green, yello	Tan to dark brown, gray
TEXTURE	Smooth to granular	Matte, medium	Granular - road Smooth - structure

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Complex, angular
LINE	Same	Strong lines created by edge effect of clearing	Vertical, horizontal, diagonal
COLOR	Same	Same	Gray, rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓							✓
LINE	✓						✓					✓
COLOR	✓				✓						✓	
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☐ LOW ☐ MODERATE ☑ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☑ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
17
LOCATION
Copperfield Road, view to the southwest
VRM CLASS
III
ANALYST
Michael Clayton
DATE
07/01/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Dominant, angular, horizontal	Patchy	Geometric and linear
LINE	Diagonal and flowing	Irregular to distinct, curved by landforms and drainages, soft	Vertical and horizontal, definite to indistinct
COLOR	Tan	Straw to light green, dark green	White, red, brown
TEXTURE	Smooth to granular	Matte, scattered	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Noticeable horizontal line created by edge effect of clearing	Parallel/vertical, horizontal/curved
COLOR	Same	Same	Rust, brown to gray
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓						✓	
LINE	✓					✓					✓	
COLOR	✓				✓					✓		
TEXTURE	✓				✓				✓			

TERM: ☑ LONG ☐ SHORT

LEVEL OF CHANGE: ☐ VERY LOW ☐ LOW ☑ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☑ YES ☐ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
18
LOCATION
Northeast corner of North University Park and University Green; view to the north
VRM CLASS
Unclassified
ANALYST
Michael Clayton
DATE
07/01/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Horizontal, rolling	Patchy to indistinct	Linear to curved
LINE	Linear to diagonal, simple	Irregular, soft	parallel/weak, perpindicular/broken, curved
COLOR	Tan	Straw yellow, light green, dark green	Brown to gray
TEXTURE	Smooth to granular	Matte	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Same
LINE	Same	Noticeable horizontal line created by edge effect of clearing	Same
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Same

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓						✓	
LINE	✓					✓					✓	
COLOR	✓				✓						✓	
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☐ LOW ☑ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☐ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
19
LOCATION
West end of Hoge Road, view to the west
VRM CLASS
III
ANALYST
Michael Clayton
DATE
07/01/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Angular to rolling	Patchy to indistinct	Strip to vertical
LINE	Horizontal to curved, flowing; diagonal, simple	Irregular to linear, soft; curved by road cut	Vertical, hard; diagonal, soft
COLOR	Tan	Tan to light green and dark green	Brown to gray and red
TEXTURE	Smooth to granular	Matte	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Noticeable horizontal line created by edge of clearing	Parallel/vertical, horizontal/curved
COLOR	Same	Same	Rust, brown to gray
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓						✓	
LINE	✓					✓					✓	
COLOR	✓				✓						✓	
TEXTURE	✓				✓				✓			

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☑ LOW ☐ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☑ YES ☐ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
20
LOCATION
Warner Avenue Northbound, north of Highway 299, view to the north
VRM CLASS
III
ANALYST
Michael Clayton
DATE
06/16/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Flat to gently rolling terrain	Simple vegetative pattern, indistinct	Low rectangular and high linear
LINE	Horizontal, soft	Weak and undulating to distinct, rounded, and angular	Horizontal/hard; vertical/weak
COLOR	Light green to tan	Pale yellow, light green, dark green	Gray, tan, white, brown and reddish
TEXTURE	Smooth	Smooth to matte	Smooth to granular

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Prominent, tall
LINE	Same	Same	Bold, parallel, vertical
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓						✓	
LINE	✓				✓						✓	
COLOR	✓				✓					✓		
TEXTURE	✓				✓				✓			

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☐ LOW ☑ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☑ YES ☐ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
21
LOCATION
Highway 299, view to the east
VRM CLASS
II
ANALYST
Michael Clayton
DATE
06/17/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Flat/indistinct to irregular/bold terrain	Complex vegetative patterns	Horizontal/linear/prominent; Rectangular, low
LINE	Horizontal and angular, complex	Irregular	Parallel/weak; parallel/bold/curving; varied/complex, weak
COLOR	Tan to gray, and dark blue	Yellow, light green, dark green	Gray, white, tan, red, yellow, brown
TEXTURE	Smooth	Smooth to mottled, random	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Dominant, tall, vertical
LINE	Same	Same	Bold, parallel, perpindicular
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓							✓
LINE	✓				✓							✓
COLOR	✓				✓						✓	
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☐ LOW ☑ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☑ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
22
LOCATION
Highway 299, 1.7 miles west of Highway 395; view to the southwest
VRM CLASS
II
ANALYST
Michael Clayton
DATE
06/16/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Flat to gently rolling terrain	Simple vegetative pattern	Rectangular, linear, strip, distinct
LINE	Horizontal and diagonal, soft	Irregular	Horizontal/continuous/hard; vertical/ broken/weak
COLOR	Tan	Yellow, light green, dark green	Gray, tan, brown, white
TEXTURE	Smooth	Smooth to mottled	Smooth

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Complex, angular
LINE	Same	Same	Vertical, horizontal, angular
COLOR	Same	Same	Gray and brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓						✓	
LINE	✓				✓						✓	
COLOR	✓				✓					✓		
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☐ LOW ☑ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☑ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
23
LOCATION
Western shore of Nelson Corral Reservoir; view to the south
VRM CLASS
II
ANALYST
Michael Clayton
DATE
06/19/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Land: rolling, angular blocks Water: oval	Patchy	-
LINE	Land: horizontal and rounded Water: curving	Jagged, indistinct to well-defined, diagonal	-
COLOR	Land: tan Water: blue	Tan, light green, dark green	-
TEXTURE	Land: smooth to granular Water: matte	Matte	-

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Same	Vertical
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓					✓		
LINE	✓				✓						✓	
COLOR	✓				✓					✓		
TEXTURE	✓				✓				✓			

TERM: ☑ LONG ☐ SHORT

LEVEL OF CHANGE: ☐ VERY LOW ☑ LOW ☐ MODERATE ☐ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☑ NO

VISUAL CONTRAST RATING DATA SHEET
Alturas Transmission Line Project EIR/S

KEY OBSERVATION POINT DESCRIPTION

KEY OBSERVATION POINT
24
LOCATION
Fort Sage Off-Highway Vehicle Area Trailhead, view to the east
VRM CLASS
III
ANALYST
Michael Clayton
DATE
06/21/94

CHARACTERISTIC LANDSCAPE DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Prominent, rugged	Indistinct, diverse, clumps	-
LINE	Jagged, horizontal and angular	Irregular, complex, sparse	-
COLOR	Tan to dark brown	Tan, dark green, mottled subtle yellow and light green	-
TEXTURE	Coarse and granular	Matte, uneven	-

PROPOSED ACTIVITY DESCRIPTION

	LAND/WATER BODY	VEGETATION	STRUCTURES
FORM	Same	Same	Linear
LINE	Same	Same	Parallel/vertical, horizontal/curved
COLOR	Same	Same	Rust, brown
TEXTURE	Same	Same	Smooth

DEGREE OF CONTRAST

	LAND/WATER BODY				VEGETATION				STRUCTURES			
	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG	NONE	WEAK	MODERATE	STRONG
FORM	✓				✓							✓
LINE	✓				✓							✓
COLOR	✓				✓						✓	
TEXTURE	✓				✓					✓		

TERM: ☑ LONG ☐ SHORT **LEVEL OF CHANGE:** ☐ VERY LOW ☐ LOW ☐ MODERATE ☑ HIGH

DOES PROJECT DESIGN MEET VRM OBJECTIVES? ☐ YES ☑ NO

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